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Contractors *and* Engineers Monthly

Vol. 49, No. 8

AUGUST, 1952

\$4 a Year, 50 Cents a Copy

Covering the Field

• Tunnel Lining

A pneumatic placer "blows" concrete as far as 750 feet to line a tunnel. Read about it on page 4.

• Protect Your Checks

Contractors, be on your guard against check swindlers. Advice on page 9.

• Building Construction

A six-level terminal brings a commercial airfield up to date. Page 12.

Prestressed-concrete girders for a college dining hall. Story, pix, page 54.

Drilling with tungsten-carbide bits speeds concrete-block removal. Page 87.

• Airports

Rubber-tired scraper rigs push a 1,700-foot runway extension. Page 18.

Have jets made present-day airfields out of date? Views on page 52.

• Bridge Construction

Pages 20 and 21 tell a bridge-building story in words and pix. It was tough spanning this arroyo.

• Pipeline Crossing

Laying a natural-gas pipeline across the Mississippi was a battle with the elements. Read how it was done, page 30.

• Public Relations and Highways

State highway departments must win public support, Ohio chief says, page 33.

• Stabilized Roads

Soil stabilization is one answer to increasing aggregate shortages. Read what a contractor thinks, page 36.

• City Fights Flood

The toughest fight in years, but Salt Lake City won it. Story on page 42.

• Bituminous Paving

An old gravel road gets a double tar seal coat. Turn to page 47 for story.

• Harbor Dredging

A dipper-type dredge does a 40-foot harbor-deepening job. Story on page 61.

• Concrete Paving

Pavement removal, regrading, widening make over Oklahoma City streets. Story and pix are on page 67.

• Rubber-Asphalt Roads

England has had some long enough to test them out. Read about them, page 74.

• Soft-Foundation Roads

Engineers recommend methods of road building on soft subsoils. Page 81.

• Equipment Servicing

A contractor repairs his own equipment. Read about his shop on page 90.

• Air-Entrainment

A BPR report says that age causes no further reduction in the strength of air-entrained concrete. Page 96.

• Snow Removal

Thought about snow yet? Idaho mounts blows on 4-wheel-drive trucks. Page 99.

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C. & E. M. Photo

Let's cool off with the dipper dredge Crest in Boston Harbor, as it extends and deepens the main channel. Great Lakes Dredge & Dock Co. held the contract described on page 61.



British Information Services Photo

Massive booms of steel swing to and fro over swiftly moving water almost 3,500 miles up the River Nile. Eventually a dam will close the 80-foot gap to provide power for the young industrial sinews of the British Protectorate of Uganda. But, for local people, at the moment, it's still just a good place to fish.

NEWS AND VIEWS

of the construction industry - CPR 105 revised, biggest road bill yet



Final levels of steel allocations for the fourth quarter will not be established until after the strike ends. DPA's Henry Fowler assures users, however, that advance fourth-quarter allotments will not be disturbed, although adjustments may be necessary later.

Construction activity continues at a spirited pace, with outlays for new construction hitting a record of \$14.9 billion for the first six months of this year. That's a 4 per cent increase over 1951 . . . Students of the business outlook prophesy a good year which may carry over into 1953.

It looks like pressure from the Associated Equipment Distributors has finally borne fruit. **CPR 105**, the regulation which determines price ceilings on used construction machinery and parts, has now been revised. **One of the most important changes permits freight charges to be included in the base price**, from which the ceiling price is computed. This ceiling price for rebuilt and guaranteed machinery is either 85 per cent of the base price or a price determined by the depreciation method. For used machinery that does not qualify as rebuilt and guaranteed, the ceiling is 55 per cent of the base or that determined by depreciation.

We have noted from time to time how **more and more agencies are getting on the bigger and better-highways bandwagon**. Here's a new one to add to the list—Merrill Lynch, Pierce, Fenner & Beane. The famous Wall Street brokerage firm devoted a special issue of its "Investors' Reader" to the cause . . . **Look** magazine cast a pretty dim view of the highway future in its March 11 article "Why Motorists Blow Their Tops". The editors have issued this statement of policy: "**Look** intends to focus increasing attention on the nation's automotive problems in the months ahead."

Some of the highway talk must be reaching Congressional ears, however. **A record \$1,385,000,000 was voted as Federal Aid**. The Government will allocate \$575,000,000 during 1954 and 1955 to be matched by participating states. Also included in the bill is a new fund starting at \$25,000,000 for the Interstate Highway System. The amount is hardly a drop in the bucket, but it does show recognition of the problem. For a list of the allocations state by state, see page 98.

Something always seems to throw up a barricade in the path of progress. As Congress votes more for the nation's bulging highways, **construction on the much needed 88-mile Oklahoma Turnpike is creeping to a standstill**. Shortages of reinforcing steel as a result of the strike have caused a number of bridge projects to cease operations. Fortunately, the asphaltic-concrete paving can continue.

Highway news of a lighter nature comes to us from Wyoming. The State's Commerce and Industry Department is **using a road construction project as a tourist attraction**. Travelers on the new highway in Telephone Canyon are invited to look over the work which they are assured will be an "attraction in displaying modern methods and machinery used in highway construction". Signs and flagmen keep the traveler on the right route.

Complete withdrawal by the Federal government from the field of gasoline taxation was urged at the recent Governors' Conference in Houston, Texas . . . **Decontrol in general seems to be gaining favor in many quarters** . . . At the same time, however, the U. S. Department of Commerce reports that one dollar out of six now paid in wages goes to a Government worker.

Hamilton Wright Photo

Rising out of the heart of the city of Caracas, Venezuela is this \$300,000,000 "Rockefeller Center". Directly in front of each of the two twin buildings now completed, a 30-story office building will overlook an express highway.

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Speak Up, Engineers!

There's too much hiding of lights under bushels where U. S. engineers are concerned. Engineers should publicize their achievements, said Hartley W. Barclay, Industrial Advertising Manager of "The New York Times", speaking before the annual meeting of the New York Chapter of the New York State Society of Professional Engineers. Why be shy about major engineering gains in flood control and waterways;

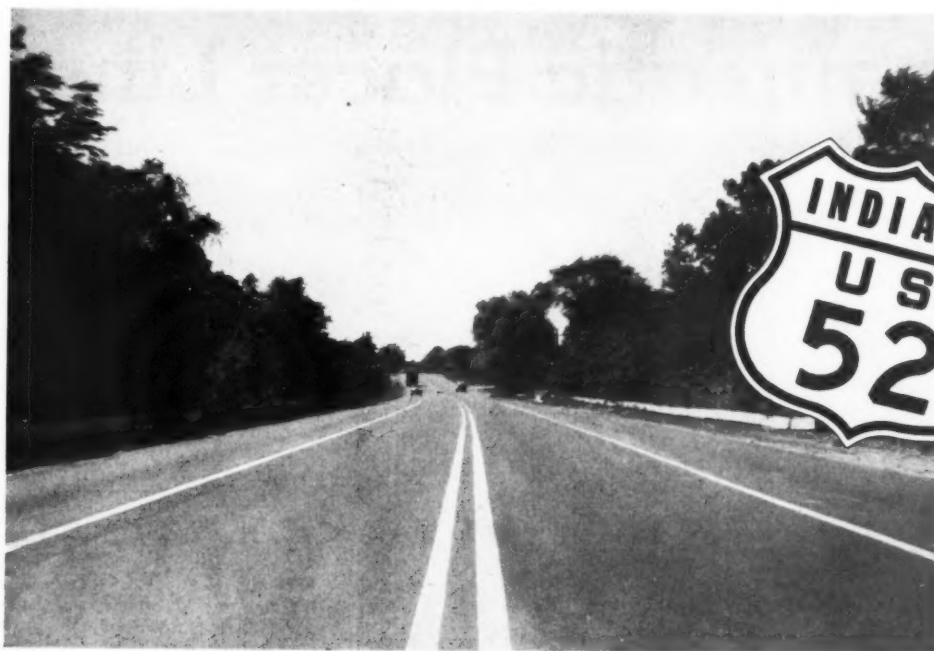
transportation and highways; smoke control and combustion efficiency; water supply and storage; safety in civic and industrial affairs and in aviation; power generation and fuel supply; and communications and understanding of technological progress? These are only a few achievements, said Mr. Barclay, yet few people in the engineering field have taken the time to tell how these gains came about, and who was responsible for them.

Mr. Barclay suggested these steps

1. Define major new projects for engineering communications.
2. Expand the use of the press, radio, direct mail, and public-affairs events.
3. Organize adequate staffs for managing communications tasks.
4. Use high standards of composition, publication, and distribution.
5. Stockpile and index standard data so that the achievements of engineering may be an "open book" and record.
6. Expand effective circulation for developed data.

Indiana constructs heavy-duty Texaco Asphaltic Concrete on

one of the Midwest's main highways



Traffic on this 11-mile section of US Route 52 north of Indianapolis, Ind., is now served by a resilient, heavy-duty Texaco Asphaltic Concrete pavement.

Where US-52 cuts across the State of Indiana, it becomes the principal highway used by traffic between two of the midwest's largest cities, Chicago and Cincinnati.

An 11-mile section of the highway north of Indianapolis had failed to the point that it no longer provided a satisfactory riding surface. The aim of the Indiana Highway Department was to improve this section so that it would be fully adequate for modern traffic, at reasonable cost. A resilient, heavy-duty Texaco Asphaltic Concrete surface, laid over the existing pavement, has met the State's requirements in all respects. The new Texaco surface was put down in two courses, binder course and wearing surface, each 1½ inches thick.

Whether road builders are constructing an asphaltic concrete pavement in Indiana, an asphalt penetration macadam road in Connecticut, a sand asphalt project in Florida, or giving a Texas highway a double asphalt surface-treatment, you will find them using Texaco Asphalt products this year, as they have been doing for almost half-a-century.

Products of scientifically selected crudes, Texaco Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils deliver consistently good results in whatever type of asphalt road, street or airport construction they are used. Write for our two booklets which furnish helpful information on the various types of asphalt construction.

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TEXACO ASPHALT



Here is some of the equipment that served on the Philadelphia storm-relief sewer-tunnel job: a Unit crane at the shaft, a Worthington Pneumatic Placer, an Eimco RockerShovel, and a Pennsylvania 7-AT vacuum pump.



And here are some of the people: Project Manager D. J. Lombardi, Master Mechanic Jafolla, Office Manager J. P. Lombardi, Jr.

Pneumatic Placer Lines Tunnel

Concrete for Invert and Arch Is Blown 750 Feet Through Six-Inch Line to Build Storm Sewer Through Rock

By WILLIAM H. QUIRK,
Editor

• A STORM-RELIEF sewer tunnel was lined with concrete speedily and effectively by a Worthington Pneumatic Placer that "blew" the transit-mix material as much as 750 feet through a 6-inch pipeline at a pressure of 100 psi. At the maximum limit of 750 feet used on this job, concrete was placed at the rate of 9 cubic yards an hour. Production increased as the pipeline shortened, so that an average of 15 yards an hour was maintained for the entire 2,700-foot project. The maximum was 27 cubic yards an hour.

The tunnel is part of a comprehensive storm-relief program of the city of Philadelphia, Pa., and will provide relief from flooding, after heavy storms, for a large area in the Logan section east of Broad Street. Initiated nearly twenty years ago, the project was delayed by World War II and the materials shortage, but finally got under

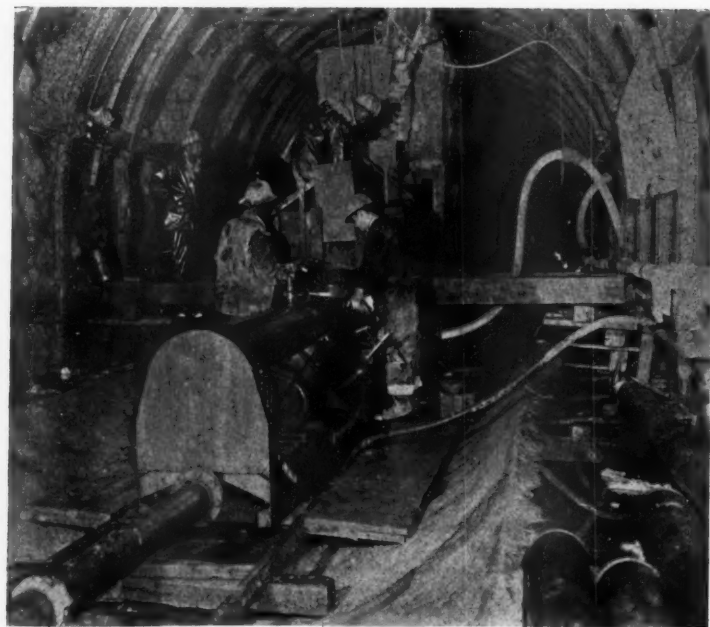
way in December, 1950, after the city Department of Public Works awarded a \$1,350,000 contract to Joseph Lombardi & Sons, general contractor, of Philadelphia. The job was completed in May of this year.

Stationing of the 2,700-foot flood-relief tunnel begins just east of 9th Street, and runs west along Wingohocking Street to Old York Road where there is a slight turn to the right into Belfield Avenue that connects with Broad Street where the project ends. The flow is eastward, with an average drop in the grade of 8 inches to 100 feet. From the east end of the tunnel, existing sewer lines carry the flow to Frankford Creek, about one mile distant; the creek empties into the Delaware River just north of the Bridesburg section of Philadelphia.

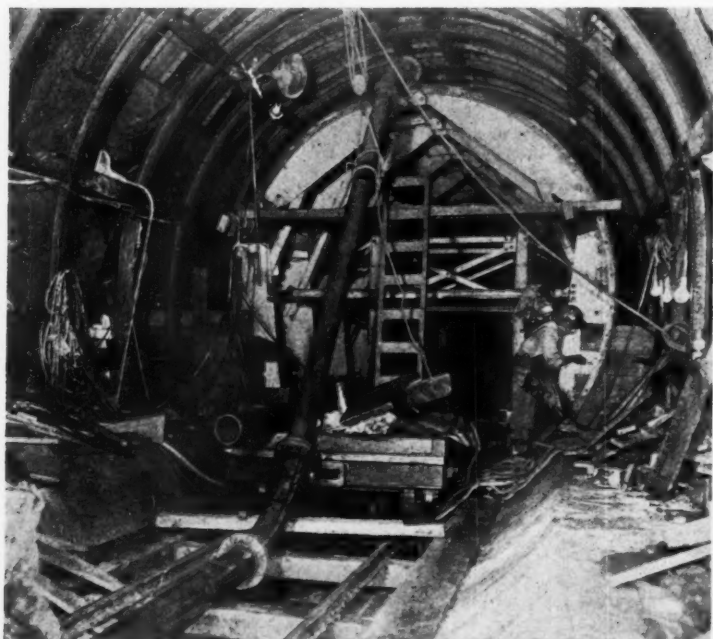
Tunnel Section

Two different cross sections of sewer were constructed. Because of insul-

(Continued on next page)



Down in the tunnel, the Worthington 14-cubic-foot Pneumatic Concrete Placer receives concrete from a rail-mounted batch hopper under a drop hole.



At the discharge end, the 600-foot pipeline from the placer makes a 14-foot lift before it enters Blaw-Knox tunnel forms. Notice the supporting steel which was left in place.



Here a Blaw-Knox form has been dropped from a recently completed section of concrete lining and is ready to be moved on to another section.

ficient depth at the west end near the Broad Street subway, the sewer was built in open cut for 357 feet. For this short distance the tunnel is a conventional box-type structure—14 feet wide x 16 feet high—with a transition into an existing 16 x 17-foot circular cross-section concrete sewer.

For the rest of the distance east of the box portion, the tunnel has a circular cross section flattened at the bottom. Inside width and height dimensions are 17 and 16 feet respectively. At the top, the curved invert is 11 feet wide, while the flat bottom width is 12 feet. Both walls and invert of plain concrete are 18 inches thick; at the sides the invert section is 30 inches in height. At the east end there is a transition into an existing 12 x 21-foot horseshoe-shaped sewer.

At the west end of the circular tunnel the invert grade is 39 feet below the ground; at the eastern end the tunnel is deeper, with the invert grade 51 feet below the level of the street. A future subway planned for Roosevelt Boulevard will pass above the sewer near its eastern end.

Through Rock

For its entire length the tunnel was driven through rock—a mica stratum, for the most part, that underlies nearly all of Philadelphia. A shaft was sunk, 52 feet deep, at the midpoint of the tunnel near the corner of Wingohocking and 11th Streets, and the drilling was done both ways from the bottom of the shaft. Lined with 3 x random-length timber sheathing and braced with 12 x 12's, the shaft had inside dimensions of 12 x 22 feet. The contractor worked only a single shift, drilling one face while mucking the other face.

Above-ground activity was limited to the small lot surrounding the shaft. Within its wooden-fence enclosure was the hog house containing lockers and showers for the sand hogs, a compressor building, offices for the contractor and city inspectors, two underground magazines containing the dynamite caps and powder, and storage space for the various materials and equipment needed in the construction.

Drilling was done from a jumbo moving on tracks and holding eight Ingersoll-Rand DA-35 drifters, in which were used 1½-inch drill steel in 2, 4, 6, and 8-foot lengths to get a 6-foot shot. Carbide-tipped 1¼-inch Rok-Bits were employed. City water for the bits went up to the heading through a 2-inch pipeline, while the high-pressure air was carried in a 4-inch line. Air for the muckers, pneumatic concrete placers, and the drills was supplied by Le Roi compressors—three at 600 cfm and one 500-cfm machine, housed in the compressor building. They pumped into a 3-foot-diameter x 18-foot-long receiver, and from that the air was carried down the shaft in a 6-inch line. At the bottom a 4-inch pipe led off to the east and west headings.

Victaulic couplings were used throughout the job for all pipe connections, and Goodall supplied the necessary hose.

Drilling and Mucking

Two Joy blowers, one for each heading, furnished low-pressure air for ventilation. They were powered by 25-hp motors, and were connected to 18-inch-diameter Naylor spiral-welded steel air lines that ran up the side of each tunnel to the heading. The machines were reversible, with air being blown in to the men while they were at work, and the noxious gases drawn off after a blast, with the blowers used as exhaust fans.

An average of 100 holes were drilled for a 6-foot shot in the full-face tunnel. Atlas and Hercules powder, 40 per cent strength, was used with 14 delays. Approximately 11½ cubic yards of rock was excavated per linear foot of tunnel. After the shot when the big fans

removed the fumes, a Lamb air mover also helped to freshen the air in the shaft, particularly on humid or foggy days. Then the mucking began.

A pair of Eimco 21 air-operated RockerShovels worked abreast at the heading on the mucking operations. They ran on 3-foot-gage tracks that were also 3 feet apart. The drill jumbo moved along on the inside rail of each track, which was laid out with a double switch and crossover on each side of the shaft. The ½-yard mucking machines loaded the rock into 2-yard dump bodies mounted on mine flatcars that were pulled by Goodman 6-ton electric locomotives. They were powered by 48-volt storage batteries.

A horizontal overhead cherry-picker, powered by an Ingersoll-Rand tugger hoist, switched cars at the heading. The tugger held a section of I-beam that had a sling at each end for lifting a car. Thus when an empty came in on one track, it was picked up and set down on the parallel track while the locomotive removed the car that had just been

loaded by the mucker. The tugger itself rolled along another I-beam that had been secured to the arch-supporting ribs.

Supporting Steel

Cars were moved out to the bottom of the shaft where the boxes were raised to the surface by a Unit 1020-A crawler crane that was stationed alongside the hole. The crane was equipped with a 35-foot boom and Roebling ¾-inch nonrotating cable so that the boxes or buckets would not spin around on the way up. Material was hauled away in dump trucks, of which there were four Ford F-8's on the job, and wasted in a spoil area at 5th Street and Roosevelt Avenue, a 20-minute round-trip haul from the job site.

Following the blast, and in pace with the mucking, came the steel setting, for the tunnel was supported throughout by Bethlehem Steel Co. ribs and liner plates. The ribs, or uprights, were 6-inch 20-pound H-beams, set 21 feet 6 inches apart or opposite to each other

on centers, and spaced longitudinally according to the condition of the rock. Average spacing was 48 inches, with the ribs supported on 10 x 12 x ¾-inch-thick foot plates. Fanning out overhead to cover 120 degrees of arch were ½-inch liner plates supported by the ribs, to protect against spalling rock.

Over nearly all the job the steel came in two segments that were fitted together at the top to form a pair of ribs. For a short section at the west end of the tunnel, the steel was divided into four segments, a break occurring at the spring line. This was done when about 500 feet of the tunnel arch was first benched out, and the steel ribs for the arch were supported on sleepers along the sides. Then as the remainder of the heading was excavated, the load was transferred to the upright members.

After the steel was set, drilling was resumed for the next round followed by the shooting and mucking as before. All supporting steel was left in place and embedded in the concrete lining of

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When the job calls for **PULL**



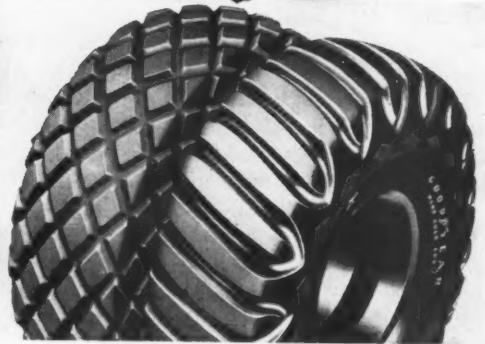
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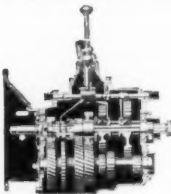
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Pneumatic Placer Lines Sewer Tunnel

(Continued from preceding page)

the tunnel. Openings behind the steel back to the neat lines of the excavation were later filled with grout. In some locations, because of overbreak, the apertures to be filled in had widths up to 45 inches. Grout holes 2 inches in diameter were drilled about every 35 feet into the roof of the tunnel.

Concrete Lining

Transit-mix concrete for the 18-inch tunnel lining came from a local supplier—Liberty Ready-Mix Concrete Co.—and was delivered to the site as needed in six 5-yard truck mixers. Two drop holes were drilled from the street through 26 feet of rock into the roof of the tunnel, each at the approximate midpoint of the east and west halves of the project. The holes were lined with 8-inch cast-iron pipe, and capped off at the street level for opening only

when concrete was to be placed.

With the two drop holes and the shaft, concrete was thus delivered to the job at three locations about equal distances apart. The 2,500-psi concrete was dumped into the drop holes, and then passed through elephant-trunk pipe from the roof of the tunnel into 3-yard hoppers set up on the tunnel floor. From the hopper the concrete was discharged continuously into the Worthington Pneumatic Placers that "blew" it through a 6-inch pipe as far as 750 feet. On these long pours, 2,300 cfm of air was available, but air requirements decreased at the rate of about 100 cfm for each time the pipeline was shortened by 100 feet.

The invert was placed first using a fairly stiff mix, and no forms were required. After the screeding was done by hand, the surface was vacuum-processed with four mats at a time, each measuring 2 x 4 feet. A Pennsylvania 7-AT vacuum pump on the vacuum machine removed the surface water from the 11-foot-wide invert, leaving a denser concrete. Finishers then smoothed off any irregularities with their trowels. Air-operated I-R internal vibrators were used in the placing of the concrete.

Steel Forms

Above the invert, concrete was placed in the sides and arch of the tunnel with Blaw-Knox steel forms. Two 40-foot sections were used, so that while one was in operation the other was being shifted to another location. The form rode on rails and was divided into five segments. It was raised or lowered by four Blackhawk hydraulic jacks, with two other jacks on each side to control the wings. Forms were well oiled before any concrete was placed.

A triangular-shaped frame riding on a flatcar carried the concrete pipe up to the top of the form where the mix was discharged at the far end. As the placing of the concrete advanced, a 10-foot length of pipe was removed at the end near the drop hole, and the entire line was pulled back 10 feet by an I-R air tugger. After a section was poured and the concrete had hardened, the form was easily collapsed and moved to a new section.

The tunnel was fairly dry most of the time. A 5-inch vitrified-clay subdrain was laid under the concrete, and there was also a 2-inch waste-water line running back to the shaft. There the water was collected in a sump and raised to the surface by a Marlow 3-inch electric pump. Two other electric-driven pumps—a LaBour 2-inch and a Jaeger 1½-inch—were also on hand for use when necessary. Light and power into the shaft and tunnel were taken off a 220-volt line of the Philadelphia Electric Co.

Quantities and Personnel

Tunnel excavation totaled 27,000 yards, while 9,100 yards was taken from the open-cut section. Tunnel lining required 10,500 yards of concrete, and the open cut accounted for 1,500 yards in the box section. The latter also used 120 tons of reinforcing steel.

Joseph Lombardi & Sons, general contractor, had a maximum force of 90 on the project at one time, working a single 8-hour shift. Key personnel included Dominic J. Lombardi, Project Manager; Joseph P. Lombardi, Jr., Office Manager; Hugh Bingham, Superintendent; George Ferris, Drilling Foreman; Sam Rogers, Mucking Foreman; and Henry Jafolla, Master Mechanic.

For the City of Philadelphia, Department of Public Works, Thomas Buckley is Director, with A. Zane Hoffman, Chief of Bureau, and Samuel S. Baxter, Acting Chief Engineer. Felix Zalinsky, Construction Engineer, supervised the field operations, with David Moss and Pete Simetti as Engineer-Inspectors at the job site.



It's only one-twelfth the size of the real Cat bulldozer but it's built to withstand that sand-pile punishment.

New Toy Bulldozer

Children engaged in building backyard roads and excavating sand piles can now use a scale model of the Caterpillar bulldozer for some of their heavy earth-moving. The toy bulldozer is exactly one-twelfth the size of the Cat and weighs 5 pounds. It is 15 1/2 inches long.

The only parts of the toy which are not 18-gage steel are the 3-position movable blade and the model engine. The blade is 16-gage steel and the engine is specially prepared plastic. To give the toy as much strength as possible, all joints are spot-welded. Tenite, a tough composition designed to withstand the punishment of weather and small hands, is used for the movable blades.

Further information may be secured from the Charles W. Doepke Mfg. Co., Blue Ash Road and Emerald Ave., Rossmyne, Ohio. Or use the Request Card at page 16. Circle No. 402.

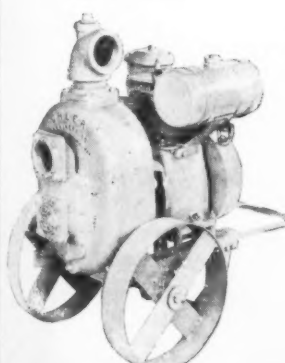
Self-Priming Pump

A new 3-inch self-priming centrifugal pump with a 15,000-gph capacity has been introduced by Ohler Machinery Co., P. O. Box 687, Waterloo, Iowa. It features the company's Twin Prime method of priming designed to eliminate all priming valves and easily clogged jets. The company claims that no recirculation occurs while the pump is pumping.

Dual-volute construction is said to prevent clogging with sand, mud, or debris. One volute discharges at the bottom of the pump case, keeping it continually flushed out and clean. The other volute discharges toward the top of the pump case for maximum priming ability.

The pump is powered by a Wisconsin Briggs & Stratton engine and is furnished on steel or rubber-tired wheels. Other features claimed include an open trash-type impeller; grease-lubricated double shaft seal; replaceable check valve; and flanged inlet and outlet connections.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 462.



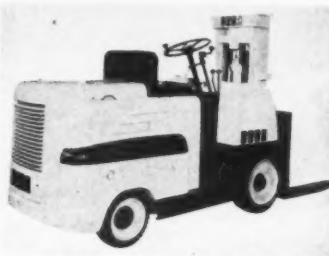
Dual-volute construction features the Ohler 3-inch self-priming centrifugal pump.

New Fork-Lift Trucks

New 6,000-pound-capacity fork-lift trucks, the gasoline-powered Model FT-60-24 and diesel-powered FTD60-24, have been brought out by The Buda Co., Harvey, Ill. They are rated at a 24-inch load center and are available with a choice of two gasoline or two diesel engines.

Model FT60-24 is powered by a Buda 73 1/2-hp 6-cylinder gasoline engine and is available with a Buda 4-cylinder 53 1/2-hp gasoline engine as optional equipment. A 6-cylinder Buda diesel engine with a 230-cubic-inch displacement is standard for Model FTD60-24, with an optional 4-cylinder 182-cubic-inch-displacement diesel engine.

Features of the fork trucks include



Buda's new 6,000-pound capacity fork-lift truck is available in gasoline or diesel-powered models.

accessibility of all parts for service and maintenance; complete complement of electrical gages on the full front-vision instrument panel; automotive-type

single-lever gearshift mounted on the steering column; and a quick-change heavy-duty industrial-type clutch. A 72, 84, 108, 114, or 120-inch lift is available as standard on either the diesel or gasoline-powered trucks.

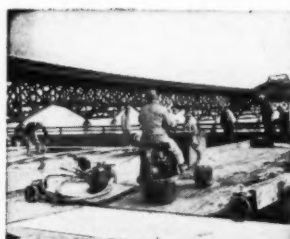
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 482.

Ginther Joins Wood Mfg. Co.

A. W. Ginther has taken on the job of General Sales Manager of the Wood Mfg. Co., North Hollywood, Calif., manufacturer of road-building equipment. Mr. Ginther has had 15 years' experience with Harnischfeger Corp., and was a pioneer in the building of machinery for the construction of low-cost mixed-in-place roads.

"Whiteman POWER BUGGIES are doing a TREMENDOUS JOB ON THE N.J. TURNPIKE!"

writes Larry O'Neill, Supt.
c/o Poirier & McLane Corp.



Whiteman Power Buggy on bridge section of New Jersey Turnpike.



Whiteman Power Buggy on bridge section of New Jersey Turnpike.

WHITEMAN MFG. CO., DEPT. C
3249 Cusitas Ave., Los Angeles 39, Calif.
Please send prices, literature and name of distributor for Power Buggy, Screeding Machines, Floating Finishing Machines.

Name _____
Firm _____
Address _____
City _____ Zone _____ State _____

"Our Whiteman Power Buggies are tireless workers. All day long they speed along the runways, climb steep grades, squeeze through tight spots and turn on a dime. They're doing a tremendous job, saving valuable time and cutting costs—for the simple reason they carry 13 cu. ft. of concrete at a time, which is equal to 4 hand buggies. For bridge slabs and floors, they are tops."

Larry O'Neill, Supt.
c/o Poirier & McLane Corp.

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POWER BUGGY • FLOATING & FINISHING MACHINES • SCREEDING MACHINES

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Please send prices, literature and name of distributor for Power Buggy, Screeding Machines, Floating Finishing Machines.

Name _____
Firm _____
Address _____
City _____ Zone _____ State _____

Iron-Pipe Scaffold

An iron-pipe scaffold that can be erected to any height or width without nuts, bolts, braces, or pins, is produced by the Jagiel Mfg. Co., Swanton, Ohio.

The Kwik Skaf has two working parts—a truss frame and a tie frame. It is made in 5-foot sections and is said to be easy to transport and store. The manufacturer points out that a small pickup truck can transport enough frames for a tower 50 feet high or a scaffold 8 feet high and 35 feet long.

Feature of the Kwik Skaf is that nothing can shear. The company points out that if the ground under the base plate should give, the scaffold will bind, as there are no bolts to shear off. This binding is said to make the scaffold too tight to pry apart until the base is brought up level. With casters, the entire section of scaffolding can be moved to fit work requirements. The scaffold is designed to hold 270 pounds per square foot.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 458.

Photogrammetry Association Elects Bartlett Chairman

The Association of Professional Photogrammetrists, Washington, D. C., a group of photogrammetric-engineering companies, has selected Ford Bartlett, President of Lockwood, Kessler & Bartlett, Inc., Great Neck, N. Y., as its Chairman. He succeeds Virgil Kauffman, President of Aero Service Corp., Philadelphia, Pa., who was the chief organizer of the Association and Chairman for the first 16 months of its existence. Mr. Bartlett is Vice President of the American Society of Photogrammetry and active in the American Society of Civil Engineers. His firm has completed many engineering projects in this country and abroad and is at the moment engaged in locating and engineering a pipeline across the major part of Canada.

The Association of Professional Photogrammetrists was organized on March 1, 1951, with the following declared objectives: (1) to conduct appropriate public relations toward an increased appreciation of photogrammetry; (2) to stabilize employment in the industry; (3) to create professional specifications in cooperation with map

NOW! BUCK gives you the only complete automatically-portable heavy-duty **HOISTING MACHINE** in the world!

Set up and ready to operate in less than 25-minutes... instead of hours!

Ready - rigged, self-erecting tower. Self-erecting to 40-feet, additional sections may be added if needed.

Wheels retract automatically when tower goes up... return to towing position when tower is lowered.

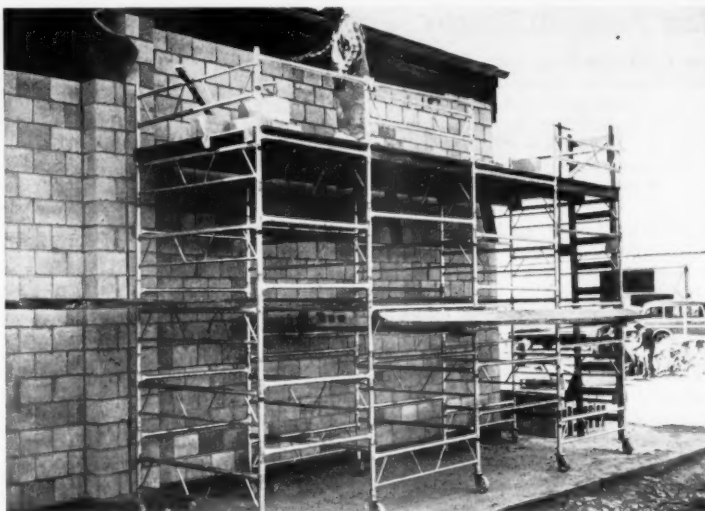
Raises 2000-pound load at rate of 100 feet per minute.

Pneumatic trailer mounted... finger-tip balance. Easily towed by pick-up truck.

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BUCK EQUIPMENT CORP.

208 Butler St., Cincinnati 2, Ohio



The Kwik Skaf iron-pipe scaffolding is easy to erect as it has only two movable parts and no units, bolts, or braces. It is made in 5 foot sections. The scaffold shown here is 20 feet long and 10 feet high.

users; and (4) to evolve ethical standards for private photogrammetrists.

Fowler W. Barker is Secretary of the Association, and its address is 17 Dupont Circle, Washington 6, D. C.

Floor-Resurfacing Method

A booklet describing a method of resurfacing floors is available from Kalman Floor Co., Inc., 110 E. 42nd St., New York 17, N. Y. It shows how the underslab is prepared, the mix controlled, and the topping applied.

To assure adhesion of the topping, the laitance and scum are wire-brushed off the old slab. Coarse and fine aggregates are carefully selected, cleaned, and then mixed with enough cement and water to form a dense mix. After the topping has been put down, the water content is reduced and then heavy power-driven disks and trowels finish the surface.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 424.

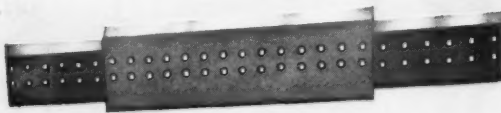
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Contractors Beware! Protect Your Checks

**Fraud Involving Raised Checks and Counterfeit Money Shows
A Marked Increase; FBI Recommendations**

By LYNE S. METCALFE

• THE construction business and those engaged in it have suffered losses from the activities of criminals. According to FBI reports, nearly 2,000,000 arrests are made in this country every year for robbery, burglary, larceny, theft, forgery, check raising, and counterfeiting. Of these, it is said, approximately one-third are crimes against business firms, the majority of which involve small business firms in which construction people figure prominently. So that with thousands of builders operating in the United States, the number of crimes perpetrated against them each year runs into the tens of thousands—and the money losses into millions of dollars. The crime showing the most impressive increase is fraud involving payment of money, and especially of checks. Though a good many builders are much more apprehensive concerning possible loss of money (or worse) through burglary and holdup, they are under a daily threat as counterfeit victims or victims of the raised check.

In fact, as pointed out in recent banking reports, checks which building firms issue in the course of business are so often "raised" by accomplished forgers and people handy with pen and knife that forgery is becoming one of the contractor's greatest sources of loss.

Steady increase in the number of checks raised has prompted interested organizations—including banking and financial groups—to issue warnings to the construction field and to suggest ways by which these losses may be reduced.

Raised Checks

In the case of raised checks it has been pointed out that though 90 per cent of all large construction firms now protect their checks with a modern protection system, the number of smaller ones using such protection is less than 15 per cent. Yet for forty years various check-protection systems have been available to business, have been used widely, and have resulted in a high degree of protection—so high that it is possible today to get a free insurance policy against such loss with each new protector.

Said Ewald Mayer of the Safeguard Organization, national authority on the subject of check protection, to this writer:

"A maxim of the common law in a check-raising situation makes the builder responsible in case of negligence. Many small-business men forget this.

"It simply means that if, by any act of negligence on the part of the check drawer (as, for instance, by so carelessly writing the check as to render it easily open to material alteration), the drawer has furnished the opportunity for the fraud which has deceived the bank, he must suffer for his carelessness by bearing the loss himself. Numerous court decisions have upheld this principle, and for that reason, any day a firm check may be raised from, say, \$4.80 to \$480.00 or even \$48,000.00 with a total loss to the drawer.

"Checkwriters today are designed to make it practically impossible to raise a check. Over the past forty years improvements have been significant. They have been brought well within the reach of the smallest business man. In fact, the smaller his business is, the less

is it able to stand a serious loss through the raising of a check."

Counterfeiting

Now, with respect to counterfeiting, another cause of cash losses in the construction trade: too few firms take

steps to protect themselves and their business against this form of crime. For suggested reading on this topic, see "Checks, Their Use and Protection", published by M. D. Cotanno, Lansdale, Pa. The FBI has repeatedly cautioned business men not only to protect their checks, but also to understand the ways of counterfeiters. Every contractor should memorize these suggestions made by the FBI about checks:

1. In case of doubt do not give cash or merchandise or exchange checks in return for a check given you. Deposit it in your bank first and allow sufficient time for it to reach the bank on which it is drawn. This will go a great way in reducing your risk.

2. Look for use of different inks in either the payee name or the signature.

3. Stay clear of torn and pasted-up checks; they may be masterpieces of a genuine signature pasted to a forged check.

4. Question a corrected check even if such correction concerns only the smallest detail; it may be an altered or erased check.

5. Beware of unusual checks; only a few checks are made out to the bearer these days. Very few checks show any endorsement except bank stamps.

6. Question faded-looking checks; they may have been washed off and retinted.

7. Turn the check over to see if perforations or embossing by checkwriter look doubled up or unclear. Attempts at alteration sometimes show up clearer

(Concluded on next page)

**MORE CONTRACTORS
DO MORE JOBS WITH
LORAIN
Moto-Cranes**



BULKY LIFTS BY MOTO-CRANE

These tanks weigh 11 tons each, are 30 ft. long, 10 ft. in diameter... but they weren't too big or bulky for this 15-ton Lorain MC-254 Moto-Crane to unload and spot on the job.

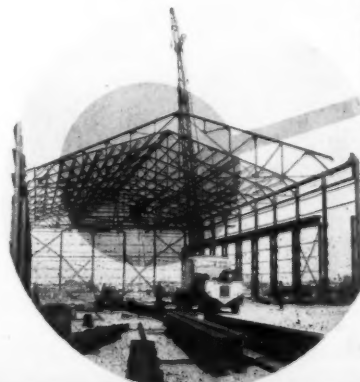


HIGH LIFTS BY MOTO-CRANE

High up in the air—and with precision spotting—go these 4-1/2-ton steel trusses with a 20-ton Lorain MC-414 Moto-Crane handling the job with ease. Lorain booms with tip extensions can reach as high as 130 feet.

"TRICKY" LIFTS BY MOTO-CRANE

There's hardly a lift a Lorain can't handle. For example, two 25-ton Lorain MC-504 Moto-Cranes team up to handle this awkward load—a kiln weighing 80 tons—unloading and moving 100 yards to foundation.



BIG LIFTS BY MOTO-CRANE

When it's a BIG lift, it's a job for the mighty 45-ton Lorain MC-824 Moto-Crane—World's Largest Crane on Rubber. Here it handles concrete pipe sections weighing 24-1/2 tons.

Whenever and wherever there's a load to lift, there's a mobile, high-speed Lorain Moto-Crane to do the job... and lower costs! From 10-ton lifting capacity up to the giant 45-ton MC-824 (world's largest crane on rubber)... you'll find more sizes, more drive arrangements, more selection in the Lorain line of Moto-Cranes... with carriers and turntables designed for each other by the pioneer of the truck-crane idea. That's why more Moto-Cranes are on more jobs today... and why it's so easy for your Thew-Lorain Distributor to show you proof on a nearby job. Ask him for job proof—before you buy!

**THEW
LORAIN.**

THE THEW SHOVEL CO.
LORAIN, OHIO



Contractors Beware! Protect Your Checks

(Continued from preceding page)

in the back than on the face.

8. Question checks showing a difference in the amount written in and the amount printed by the checkwriter.

As for money—*know your money!* Study the bills you receive, so as to become familiar with them, especially the portraits.

Compare a suspected bill with a genuine one of the same type and denomination. Especially note the portrait, since the portrait in a counterfeit is usually dull, smudgy, unnaturally white, or scratchy. The oval background is dark, lines are irregular and broken, and the portrait merges into the background.

Notice the paper, too. Counterfeit paper generally has no silk threads, but these may be imitated by very small red and blue ink lines. Genuine bills are printed on distinctive paper in



Check protection should be a construction-office routine. Here a clerk uses a Safeguard checkwriter.

which very small red and blue silk threads are scattered. The silk threads are not always noticeable on bills that are badly soiled or worn.

Rubbing a bill on a piece of paper will not prove it is genuine or counter-

feit; ink can be rubbed from good bills as well as from bad ones. The U. S. Mint uses the best type of ink and still has not found one which cannot be rubbed off. (Incidentally, the protection of checks by color imprinting of paper or so-called safety paper is not foolproof, because skilled forgers can tamper with the coloring and restore it in many cases where traces of such tampering appear.)

Finally, if you are still in doubt, consult an experienced money-handler or police officer to make sure whether a bill is genuine or counterfeit.

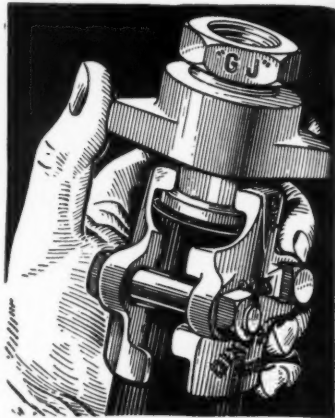
New Book on Prestressing

A new book covering the basic methods of analysis on prestressed concrete is published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y. "Prestressed Concrete Structures" by A. E. Komendant presents practical information on both the design and construction of prestressed continuous beams, prestressed trussed

girders, and prestressed shells.

The first chapter covers general principles, systems, and economic considerations. Chapter two treats the physical properties of steel and concrete. Basic prestress theory, design methods, and illustrative problems comprise the third chapter. Chapter 4 describes and illustrates a number of representative prestressed structures.

The book has 260 pages and is priced at \$6.00.



This AIR HAMMER COUPLING

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Washerless construction. All parts steel or malleable iron, in plain design... highest resistance to wear and breakage. Furnished with strong "Boss" Interlocking Clamps. Compact and heavy types, in sizes 1/2", 3/4" and 1". Rustproofed.

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50-TON ON AIRPORT



FOUR-UNIT ON DAM



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Southwest Compaction Rollers

SET NEW RECORDS for compacting heavier lifts with fewer passes. On the big jobs where maximum compaction is required the Southwest gets the work done quickly and efficiently.

Weight-box units of Southwest Compaction Rollers oscillate up and down independently and provide a constant, uniform compacting load on each tire regardless of ground contours. There is no bridging, no shifting of load from tire to tire.

Sectionalized tubular yoke allows the use of any combination from 3 to 6 weight-box units. Sizes and capacities range from 10 to 100 tons, suitable for light, medium or heavy duty compacting of earth.

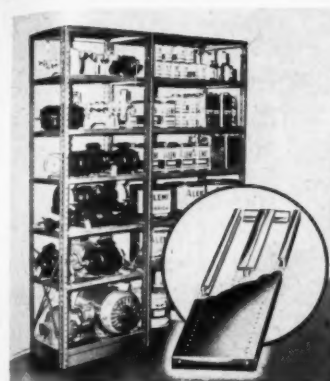
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Equipto steel shelving comes in a new super-strong line reinforced to take one-ton loads.

New Steel Shelving

A new line of shelves designed to hold as much as one-ton loads has been announced by Equipto, a division of Aurora Equipment Co., Aurora, Ill. Sides and center of the Iron-Grip shelves are specially reinforced and equipped with carbon angle irons 1 x 1 inch high and 1/8 inch thick. Front and rear have U-shaped reinforcing channels.

A special Iron-Grip stud is said to save 60 per cent of assembly time. It slips into a hole in the shelf and then into a keyhole in the upright. The shelf is then pressed down and assembly is complete. A slope in the stud combines with the slope in the keyhole to give a tight and firm grip. No nuts, bolts, or tools are needed for shelf adjustment. All shelving is instantly adjustable on 1 1/2-inch centers. Openings are adjustable from the front of units. Dividers, drawers, backs and side panels are available in all sizes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 466.

Marked Mason Line

An elastic marked mason line for laying out joints, bond, and openings is available from Tru-Line Co., 615 Flynn Bldg., Des Moines, Iowa. Tru-Line is made of yellow Nylon cord and has blue and red waterproof markings. It is wound on a flat plastic block in 100-foot units. Both standard and modular lines are made.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 404.

New Sander-Polisher

A new disk sander and polisher is available from Millers Falls Co., Hatch and Taylor Sts., Greenfield, Mass. It can be used with many rotary accessories such as drills, grinding wheels, etc., and is equipped with a special orbital attachment for fine finishing.

The No. 966 can be used for cleaning, finishing, and polishing almost any surface or material—wood, metal, plastic, etc. For rotary operation, it is furnished with a 6-inch flexible rubber pad, a 6-inch bonnet of lamb's wool, and three



The Millers Falls No. 966 sander and polisher with a No. 980 orbital attachment for fine finishing.

6-inch aluminum-oxide sanding disks in assorted grits. For fine finishing the No. 980 orbital attachment is used with one-third of any standard 9 x 11-inch abrasive sheet.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 378.

Universal Atlas Cement News

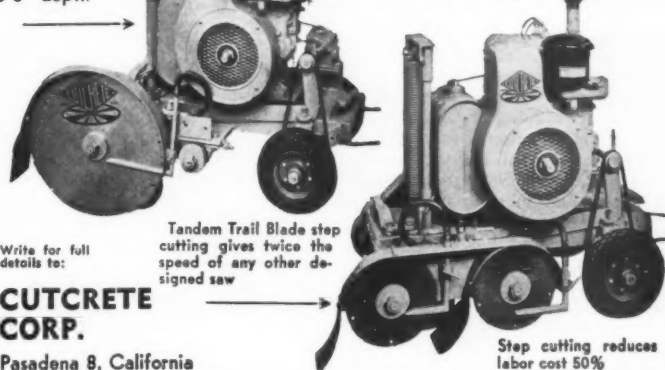
Auwell Fogarty, formerly Assistant District Sales Manager for the Indiana-Michigan territory of Universal Atlas Cement Co., New York, N. Y., has recently been appointed District Sales Manager of this territory in succession to Joseph R. Lair. Mr. Lair has retired after a career of more than 37 years with the company.

Mr. Fogarty joined Universal Atlas Cement in 1939. On discharge from the Navy in 1945 after three years of war service, he rejoined the company and has served in the metropolitan Chicago area as well as in the Indiana-Michigan territory.

CUTCRETE MODEL STT Concrete Saw

Single Trail Blade accommodates 8" to 20" blade Will saw to 8" depth

Change over in 15 minutes to single trail blade and tandem trail blade



Write for full details to:

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Pasadena 8, California

Tandem Trail Blade step cutting gives twice the speed of any other designed saw

Step cutting reduces labor cost 50%

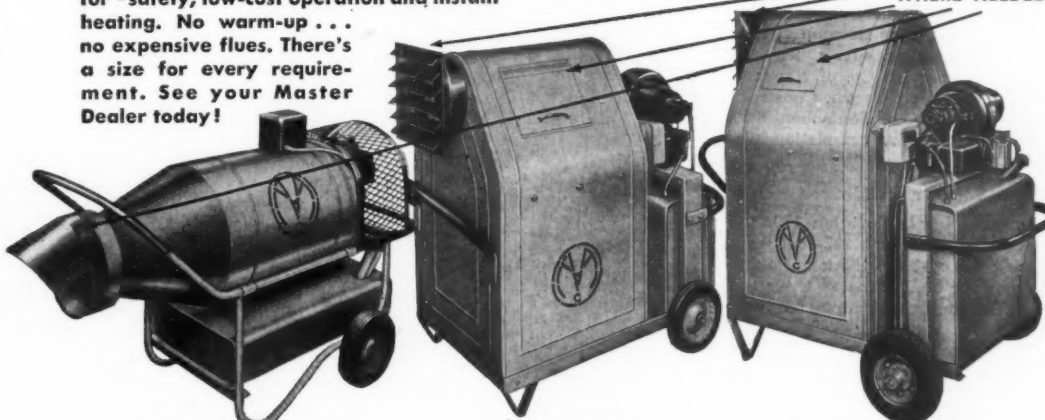


SUPER SPACE HEATERS designed for your job

Give you *Fast Safe Heat* for Drying, Thawing, Preheating, Spot Heating, Space Heating and many other uses.

These new Master Space Heaters are tops for *safety, low-cost operation and instant heating. No warm-up... no expensive flues. There's a size for every requirement. See your Master Dealer today!

DEFLECTORS THROW HEAT WHERE NEEDED



New Master B-140 high output for smaller heating jobs.

New Master H-231 for larger heating jobs.

New Master H-350 to meet large heating output requirements.

NEW MASTER SPACE HEATER SPECIFICATIONS

MODEL NO.	CAPACITY	*SAFETY	BURNER	FUEL	FUEL CONSUMPTION	HOT AIR OUTPUT	CONTROLS	SIZE	WEIGHT
B-140	140,000 BTU per hour	Indications of carbon monoxide in the exhaust gases of the kerosene fueled Master Space Heater was less than 0.001 per cent by volume... as tested by an independent testing laboratory. According to accepted standards this content is one tenth of the amount considered hazardous.	Approved by Underwriters' Laboratory	Kerosene, No. 1 Fuel Oil or No. 2 Fuel Oil	1 gal. per hr.	800 C.F.M.	Fuel tank and burner safety control, solenoid pump control, thermostat control available extra.	W-24 1/2" L-58" H-34"	145 lbs. less fuel
H-231	241,000 BTU per hour				1.65 gal. per hr.	1500 C.F.M.	Thermostat for full automatic temperature control. Fuel tank and burner safety control. Over-heat safety control.	W-29 3/4" L-51 1/4" H-43 3/4"	295 lbs. less fuel
H-350	350,000 BTU per hour				2.5 gal. per hr.	2500 C.F.M.		W-31 1/2" L-58" H-58"	360 lbs. less fuel

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101 Davis Avenue, Dayton, 1, Ohio



Master portable generator plants—heavy duty dependable continuous and standby plants 1/2 KW to 100 KW



Master Power-Blow Hammer—world's most powerful electric hammer and spade



Gasline Engine Backfill Tamper



Concrete surfacing attachments for vibrators



Terminal Building For Bradley Field

**Concrete, Steel, and Masonry Structure Has Six Levels;
Replaces Temporary One-Story Army-Type Frame Building**

• THIS summer when the new \$2,000,-000 Terminal Building is completed at Bradley Field, Windsor Locks, Conn., the busy commercial airport serving Hartford, Conn., and Springfield, Mass., will rank second to none in facilities for air travelers. The new six-level structure of reinforced concrete, fire-proofed structural steel, and masonry is one of the most modern buildings of its kind in the country. It is replacing a narrow one-story frame building constructed by the Army during World War II, that had long been inadequate for the number of passengers using the airport.

Just before the last war the State of Connecticut acquired the 1,200-acre site for Bradley Field, but soon after the start of hostilities the Army took it over for use as a fighter air base. At the end of the war it was turned back to the State, and is being converted into a major commercial airport. It is well located as to population centers, with Hartford 12 miles to the south and Springfield 13 miles to the north. The field has three 5,000-foot runways, and one is to be extended to 7,000 feet for instrument landings.

Located at the southern end of the airport, the new building is being constructed for the Connecticut Department of Aeronautics, with the State Public Works Department as the construction agency. The Federal Civil Aeronautics Administration is contributing \$500,000 to its cost, which is estimated at around \$2,000,000. W. Stuart Thompson and Phelps Barnum of New York City are the architects. The Associated Construction Co. of Hartford, Conn., is general contractor. Construction got under way in November, 1950, and is scheduled for completion this summer.

Modern Building

At ground level, elevation 170, the Terminal Building has a 297-foot front bordering the apron of the field, and is 97 feet in depth. Passengers enter the building at the rear from a roadway that encircles a parking area for 175 cars. A larger parking field is farther back. A 35-foot roadway curves up to the first-floor level, or passenger floor, at elevation 184.16. Traffic ramps and the elevated portion of the roadway are 500 feet long.

Passengers unload at this level, and their baggage is chuted down to the ground floor, elevation 171.8, where loading ramps transfer it to the planes. A truck road, with access to the

ground floor, goes under the passenger roadway. At the west end of the building there is a lower level where the boiler room and maintenance shop are located; the east portion is not excavated for a basement.

Besides the baggage-handling facilities, the ground floor also has quarters for air-mail and express shipments. Ticket counters and public waiting rooms are above that, on the passenger level, which also has a large spectator deck for those watching the movements of the planes. On the next higher



C. & E. M. Photo

A front view of the Terminal Building under construction at Bradley Field, Windsor Locks, Conn. The Associated Construction Co., Hartford, is the general contractor.

level or second floor, elevation 197.7, is a restaurant seating 265 persons, with a glassed-in side overlooking the field. Offices and service facilities of the CAA are on the third-floor level, while radio and air-conditioning equipment is

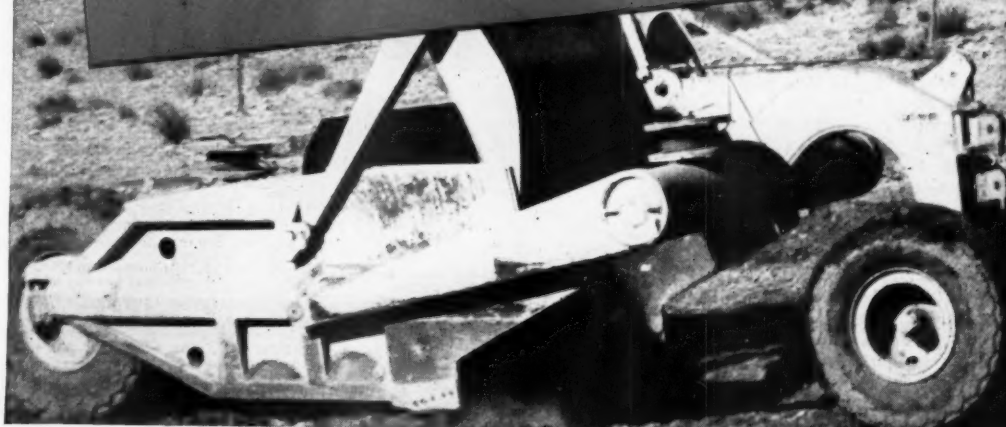
in a penthouse above that.

The control tower reaches upward from the penthouse level, with its top 86 feet above the ground floor. The building was planned to streamline

(Continued on next page)

**"TO KEEP ENGINES
AT TOP PERFORMANCE,
WE USE TEXACO URSA
OIL X** EXCLUSIVELY"**

**—Allison and Haney, Contractors
Albuquerque, New Mexico**



SIMPLIFY YOUR LUBRICATION

The Texaco Simplified Lubrication Plan lets you handle all your major lubrication with only six Texaco lubricants! Get full details from your Texaco Lubrication Engineer. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO



C. & E. M. Photo

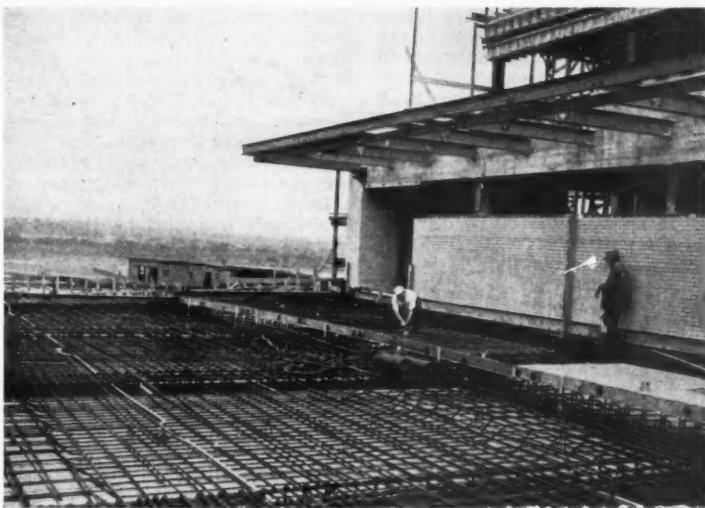
A Stanley 6-inch portable saw makes beam sides for the formwork.

passenger flow on and off the field, and to permit the easy movement of baggage, mail, and express.

Concrete and Steel

The Associated Construction Co., general contractor, performed all the masonry, carpentry, and concrete work on the job. A. E. Williams Co. of Hartford handled the grading for the site and access roads. Most of the 7,000 yards of excavation that was involved went into the roadways. Tractor-scraper units did the dirt-moving. Soil in this area is chiefly sand, graded from coarse to fine, and made a good foundation for the spread footings on which the steel columns are supported.

Concrete footings are of various shapes and sizes, ranging up to a 13 x 18 x 3½-foot slab in the boiler-room area. Transit-mix concrete for the job needs came from two sources—General Transit-Mix Concrete of Hartford, and the Roncare Concrete Co. of Windsor Locks. In the building itself, 2,500-psi concrete was used, while the concrete



C. & E. M. Photo

Here is the reinforcing steel for an upper roadway slab. It is being set in a double mat. The Scherer Steel Co., Hartford, subbed this item.

for the approach roadway was designed with a strength of 3,750 psi at 28 days. For the 12-inch foundation walls and the various other formwork on the project, the contractor used ⅝-inch plywood 4 x 8-foot panels, backed by 2 x 4 studs and double 2 x 4 wales held by Richmond ties. Two DeWalt table saws and several Stanley and Skil saw portable saws were used in the formwork.

The Scherer Steel Co. of Hartford subbed the reinforcing item, and the shortage of rods was probably the major problem on the job. Concrete was chuted directly into the forms on the lower pours, while for the higher levels a 75-foot tower with a platform hoist was erected. A Clyde two-drum hoist operated the platform. Concrete was then distributed by either a Moto-Bug or Jackson buggies. In building the upper roadway, two P&H ¾-yard truck cranes lifted concrete buckets to the forms.

Superstructure

Concrete totaled 6,000 cubic yards, while the reinforcing and structural-steel items were each about 500 tons. City Iron Works, Inc., of Hartford fabricated and erected the structural steel, the members being placed by a crane having a 110-foot boom. Lower sections of columns in the boiler-room area are 14-inch WF members. These decrease in size with the height of the building. The White Plains Iron Works of Peekskill, N.Y., had the miscellaneous iron and steel item in the contract, including stairways, railings, angle guards, etc. Besides the stairways, the building also has both a passenger and a freight elevator.

Columns are fireproofed with masonry, either brick or cinder block, while the floor beams are encased in concrete, a minimum of 2 inches on all sides. Forms for these pours were hung by wire from the beams themselves. Thickest structural slab on the job is for the upper roadway where the concrete varies in depth from 8 to 11½ inches, and contains a double mat of reinforcing. The adjoining beam at the side of the building is of reinforced concrete, 3 feet in depth.

Structural floor slabs are 4-inch RC with a rough finish, topped by 3-inch Porete lightweight fill and a 1-inch surface course. The topping consists of one part cement, one part sand, and two parts aggregate passing the ¾-inch sieve. A Turn-a-Trowel was used on the floor finishing along with hand work. Floor fills in parts of the building have various tile or terrazzo surfaces.

Masonry Work

In general the walls consist of 4-inch face brick backed with 8-inch cinder-
(Concluded on next page)



C. & E. M. Photo

A mason installs Larson waterproofed paper in the core of an exterior wall of the Terminal Building. Form preparation goes on at the level above.

AMONG New Mexico highway contractors the firm of Allison and Haney ranks high. So there's real significance in the fact that Allison and Haney use only *Texaco Ursa Oil X*** to lubricate their heavy duty gasoline and Diesel engines.

This preference for *Texaco Ursa Oil X*** is the result of ten years' experience with the clean, efficient performance of *Texaco Ursa Oil X***. Its fully detergent-dispersive properties and high resistance to oxidation have been big factors in keeping engines at top per-

formance . . . maintenance costs and fuel consumption low.

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For chassis lubrication, use *Texaco Marjak*. It's longer lasting—won't jar or squeeze out of bearings. Parts last longer. *More than 400 million pounds of Texaco Marjak have been sold!*

For wheel bearings, use *Texaco Marjak Heavy Duty*. It seals out dirt and moisture, seals itself in. Won't leak onto brakes. No seasonal change required.



Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

Faithfully yours
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for Fifty Years

Terminal Building For Bradley Field

(Continued from preceding page)

concrete blocks, and containing preformed membrane waterproofing. The Hanley Brick Co. of Summerville, Pa., supplied the 230,000 pieces of light-colored face brick and the 35,000 pieces of glazed tile. Common brick, totaling 160,000 pieces, was used in the chimney, boiler-room walls, and basement partitions, and was supplied by the Pola Co. of Windsor Locks, Conn. The 80,000 pieces of cinder-block backing came from the Hartford Concrete Units Co. A Clipper and a Champion saw were used in cutting the masonry, and the bricklayers worked from wood scaffolds.

The Larson system of preformed unit waterproofing was installed within the core of all exterior walls. A fabric flashing of impregnated 4-ounce cotton went between the cinder block and the veneer brickwork, lapping each

layer and covering the entire wall area right up to the header course. The impregnation consists of a refined asphalt in which asbestos fibers are incorporated. This item was done by the Brisk Waterproofing Co. of New York City. Exterior walls also have a 2-inch clay tile furring.

Roofs for the passenger concourse and the canopy over the roadway consist of precast-concrete planks furnished by the Art Cement Products Co. of Springfield, Mass. Planks are 2 3/4 inches thick, tongue-and-groove construction. Other areas are poured slabs covered with 4-ply 20-year-bond roofing material. Ceilings are acoustic tile. Thermopane glass is installed in the front of the building for the waiting-room and dining areas and control tower.

Personnel

An average force of 150 was employed in the construction of the new Terminal Building. Richard J. Hill was Superintendent for The Associated

Construction Co. of Hartford. Other personnel were: Engineer, Phillip Black; Clerk of the Works, Frank Berti; Carpentry Foremen, Carl Ackerman and Ernest McKay; Bricklayer Foreman, Louis Bonianto; Labor Foreman, Alexander Garewski.

George Rice was Inspector on the project for the Connecticut Department of Public Works. The State Aeronautics Commission is headed by Francis S. Murphy, Chairman. Bradley Field is used by American, Eastern, Northeastern, and United Air Lines.

A Medium-Duty Line Of Hoists and Bodies

A line of bodies and hoists for trucks of 1 1/2, 2, and 2 1/2-ton size is manufactured by Converto Mfg. Co., Third and Green Sts., Cambridge City, Ind. The hoists are available in two styles: a double-arm type for extreme loads, and a direct-lift type for average loads. Both hoists elevate the truck body to a



Converto hoists and bodies are now available for medium-duty trucks of 1 1/2, 2, and 2 1/2 tons. Dumping angle is a full 60 degrees.

full 60-degree dumping angle in a matter of seconds, the company claims.

As for the PicUPac truck bodies, Converto has added 8-gage steel on the floor for additional strength and established 6 1/2 feet as standard body width.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 471.

Teco Personnel News

The new Branch Manager of the Chicago, Ill., office of Timber Engineering Co., Washington, D. C., is Gordon T. O'Neill, a structural engineer. Mr. O'Neill is in charge of all timber-connector sales and timber-engineering consultation services which are available through the Chicago office to architects, engineers, and builders in that area. Teco is an affiliate of National Lumber Manufacturers Association, Washington, D. C.

Robert J. Hoyle, Jr., mechanical engineer and forester, joined the research staff of Teco's laboratory in Washington, D. C., last June. His first assignment there is the design of new glued-laminated products.

How to Select a Crusher

A guide for selecting the right type and size of crusher has been prepared by Pennsylvania Crusher Co., 1700 Liberty Trust Bldg., Philadelphia 7, Pa. It points out that the first step is to know the material to be crushed by determining such factors as moisture content, abrasiveness, hardness, softness, cleavage, etc.

The handbook describes and illustrates the different crushing principles and methods for reducing the material to the size and shape required, and suggests the type of crusher to be used.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 455.

New Sales Mgr. for Heil Co.

Paul Miller, formerly Washington, D. C., Sales Manager for The Heil Co., manufacturer of road machinery, has advanced to the position of Road Machinery Division Sales Manager at the home office in Milwaukee, Wis. A member of the company since 1937, Mr. Miller replaces his brother, Robert Miller, who resigned to become Sales Manager of Innes Equipment, Ltd., Toronto distributor for Heil.

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SPRAGUE & HENWOOD, INC.

Dept. C, Scranton 2, Pa.

How U. S. Rubber belt engineers cut installation costs



View of 24" U. S. Giant Conveyor Belt carrying aggregate from mixing hopper to loading hopper in plant No. 2, Builders Supply Co., Houston, Texas.

Junction between cross belt and incline belt. They convey the aggregate to concrete mixing tower, which in turn supplies the waiting trucks.



PRODUCT OF

U.S. RUBBER
SERVING THROUGH SCIENCE

In a new concrete mix plant, original plans called for the installation of a 5-ply, 36 oz. duck conveyor belt to handle the aggregates. But United States Rubber Company engineers pointed out that their 4-ply, 42 oz. duck belt would not only cost less, but would be more flexible crosswise to trough, would train more easily and provide high-tensile strength as well. This 1,275-foot, 4-ply U.S. Giant Conveyor Belt was installed. It travels 300' per minute and delivers 294 tons per hour.

This is another instance of why it pays to consult "U.S." engineers before going ahead on a conveyor belt problem. Remember that they are backed by a wealth of experience and vast research facilities. Finally, they will work with your engineers and with the designers of conveyor equipment—a 3-Way Engineering teamwork that always pays off in higher output at lower cost. Write to address below.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.



The Copyflex 14 has a 20-inch copying width and needs no masters, inks, tray developing, special lighting, etc.

New Copying Machine

An automatic machine designed to make error-proof, smudge-proof, positive copies of practically anything typed, written, printed, or drawn is announced by Charles Bruning Co., Inc., 125 North St., Teterboro, N. J. The Copyflex 14 has a 20-inch copying width, is said to be practically soundless, and needs no masters, inks, tray developing, special lighting, exhaust ducts, or installation. It takes up less than a square yard of floor space and can be rolled on its casters to any work site where it requires only a connection to a standard 115-volt 60-cycle ac power circuit. The Copyflex 14 is finished in soft tones of neutral gray.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 475.

Simplex Personnel Changes

There has been a reorganization in the sales staff of Templeton, Kenly & Co., Chicago, Ill., manufacturer of Simplex jacks. The new arrangement is as follows:

Phillip H. McManus, formerly General Sales Manager, is now Vice President in Charge of Sales; he will also travel in the far-western territory. William H. Zepp, a new recruit, will assist Mr. McManus in the states of Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, and Wisconsin. N. L. Montgomery is Manager of Mining Sales in southern Indiana, southern Ohio, Kentucky, Pennsylvania, West Virginia, and

Virginia. A new salesman, Richard S. Bowers, will assist him. William D. Boldt, South Eastern Division Sales Manager, takes over the states of Arkansas, Louisiana, Alabama, Georgia, Florida, Mississippi, Tennessee, North Carolina, and South Carolina. He makes his headquarters in Atlanta, Ga. Arthur C. Templeton, with headquarters in Dallas, Texas, covers the states of Oklahoma and Texas.

Data on Tractor Tools

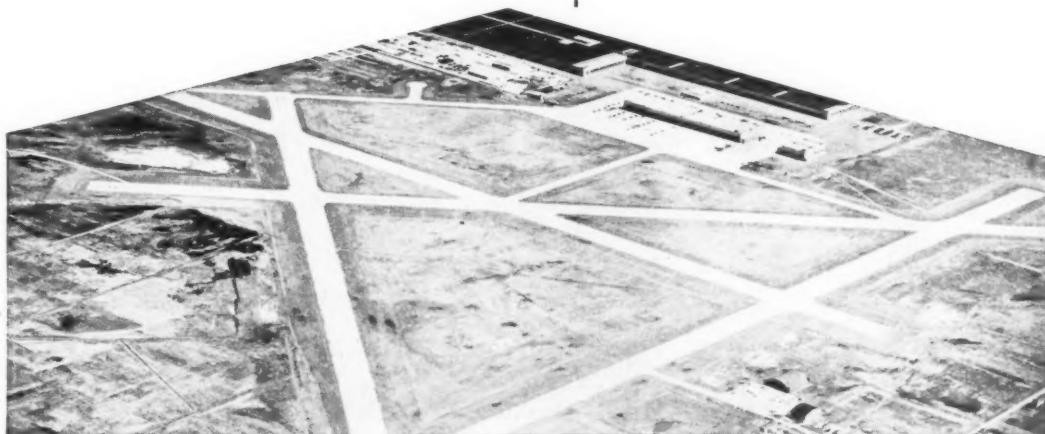
A 16-page brochure covering Hyster attachments for Caterpillar tractors is available from Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore. Written in cartoon style and printed in four colors, it shows the Hystaway excavator-crane, shovel, backhoe, dragline, as well as winches, a tractor donkey, and a yarder in use on construction and logging jobs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 470.



Ballinger Paving Co., Greenville, S. C., contractor on a section of the U. S. 41 bypass around Atlanta, Ga., saves labor with a Hughes-Keenan swing crane mounted on an X-H TD-14A crawler. Here the crane pulls a 10½-foot drag log mounted on rails to bring the subbase to final grade—only a one-man job.

8 winters... impact of countless high-speed landings prove DURAPLASTIC'S durability



O'Hare Field, Park Ridge, Ill. Designed and supervised by U. S. Engineers and the Austin Company. Contractors: Standard Paving Co., White Consolidated Inc., and Thos. McQueen Co.

Riggers PLAY IT SAFE on "high wire" jobs!



... that's why they
demand GENUINE

CROSBY CLIPS



Drop-forged,
hot-dip galvanized
wire rope fasteners
SIZES FOR ¼" TO 3"
WIRE ROPE
DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
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● For eight years, airplane tires have smacked against the Duraplastic-paved runways at O'Hare Field in Chicago. And during 8 winters, innumerable freezing-thawing cycles have severely tested the surfaces. Typically, against time, traffic and weather, the concrete made exclusively with Duraplastic* has remained durable and highly scale-resistant. Here's why:

Duraplastic cement minimizes bleeding and

segregation in concrete and thus fortifies it against the scaling action of de-icing salts and damaging effects of freezing-thawing weather.

Whether used for paving or other construction, Duraplastic air-entraining portland cement makes better concrete. Less mixing water is needed for a given slump. The resulting concrete is more workable, more plastic and more uniform. It dumps, spreads and finishes easily.

YET DURAPLASTIC* COSTS NO MORE

It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, New York.

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

CE-D-120R

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AIR-ENTRAINING PORTLAND CEMENT



Makes Better Concrete at No Extra Cost

"THE THEATRE GUILD ON THE AIR"—Sponsored by U.S. Steel Subsidiaries—Sunday Evenings—September to June

Hats Off to Safety— Hats On for the Job!

It's a far cry from the knight in shining armor to the workman of today in his less glamorous overalls. But in the matter of helmets the distance is not so great, says C. V. Peterson, District Safety Engineer for the Chicago, Milwaukee, St. Paul & Pacific Railroad. As a means of protecting the head from injury, a hard hat is still the thing, as many soldiers in both World Wars would testify. But it is only in comparatively recent times that the lumberjack and other workers on civilian projects have discarded their soft hats. Lumberjacks, miners, railroad workers, and all kinds of construction men who are exposed to the danger of falling or flying objects now wear safety helmets as a matter of routine, and in some states these helmets are obligatory for those engaged in certain occupations.

The safety helmets vary, Mr. Peterson points out. Some are of lightweight metals, some of specially prepared spun glass, and others of various compositions which make them, according to the need of the wearer, waterproof, shockproof, oil or heat-resistant. One type, in general use on The Milwaukee Road, according to Mr. Peterson, is made of a strong molded composition, rounded to deflect an object striking it from almost any angle. Its light weight makes it comfortable, and as it "floats" in a hammock-like device which fits over the head, the cutting force of a falling object is not only broken, but the shock of the blow is lessened. The hammock also creates a space between the wearer's head and his hat—result, free circulation of air in summer and room for insertion of a winter liner in cold weather.

Superintendents on construction jobs are finding more and more that the best insurance against head injuries is a properly fitted hard hat. It is a simple precaution to take for so important an objective.

Two Color Coatings

Two color coatings for beautifying bituminous pavements and waterproofing masonry surfaces are offered by Troyer Driveway Service, 2157 S. Park Ave., Buffalo 20, N. Y. Decora is an asphalt emulsion that the company claims will not stain from dirt, smoke, or dust. Decorlatex has a latex base

drills **6** inches of
concrete
per minute!



... gives lowest cost per foot of concrete drilled with a TILDEN Rotary Konkrete Kore Drill. Two-thirds more cutting surface make Tilden 70% more efficient. Drills 5 to 7 times more holes without resharpening — even reinforced concrete. Free factory resharpening! Use with any electric or air drill. 29 standard sizes, 3/16" to 4". Interchangeable shanks up to 60".

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Workmen building a tunnel on the Chicago, Milwaukee, St. Paul & Pacific Railroad wear safety hats to protect their heads from falling rocks.

and is said to be resistant to salts, gasoline, and many acids.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 428.

Cartoon Booklet Explains Proper Grader Maintenance

The importance of good equipment maintenance is stressed in a new easy-to-read cartoon booklet on Caterpillar motor graders. "Maintenance Guide" presents in story-book form the things every operator and owner should know about servicing his grader.

The booklet shows a Cat dealer giving a new owner some maintenance hints with the aid of slides. The blade is given first attention, followed by wheels, clutch, cooling system, air intake, fuel, and all other important points of good grader maintenance.

This literature may be obtained from the Caterpillar Tractor Co., Peoria, Ill., or by using the Request Card at page 16. Circle No. 409.

WINDROW CONCRETE SLABS FASTER—CLEANER—CHEAPER

with

FLECO

REG. U. S. PAT. OFF.

ROCK RAKE

Tested by Dural Engineering and Contracting Company on Atlantic Boulevard, Jacksonville, Florida.



PROBLEM

Remove 4 lanes of concrete 6" to 8" thick without disturbing fill dirt or interrupting traffic.

TOOLS

Diesel D7 equipped with 10-tooth FLECO Rock Rake

RESULTS

After a 3,900 lb. tear-drop hammer fractured the pavement, 100 linear feet of 4-lane concrete slabs were ripped and windrowed per hour by the D7 equipped with FLECO Rock Rake.

It was found that the hammer could be dropped at 10 foot intervals and the windrows were free of fill dirt, resulting in full pay-load hauls in the removal operation.

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Jacksonville 3, Florida, U.S.A.

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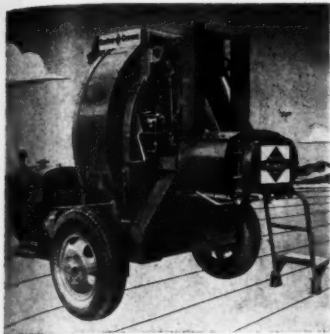
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The Barber-Greene Mixall provides high-type hot bituminous mixes for highway maintenance and small paving jobs. It can also mix all types of stabilized materials for base patching, as well as portland-cement concrete.

Portable Unit Makes Hot Bituminous Mixes

Patching with high-type hot bituminous mixes is now possible with a new portable dryer-mixer offered by Barber-Greene Co., Aurora, Ill. The Mixall is mounted on a 2-wheel pneumatic-tired chassis and can operate hitched or detached from the truck.

A power-operated skip 14 inches above ground receives aggregate and then discharges it into a rotary drying drum. The particles are lifted by the drum and drop through a blast of hot gas and flame generated by an oil burner. The heat dries the aggregate and is exhausted through twin stacks. The drying cycle is adjustable.

From the drum, the heated, dried aggregate is chuted into a twin-shaft pugmill where the particles are coated. Drying and mixing can be operated separately or in cycles of equal duration. At the end of the cycle, the entire bottom of the pugmill opens, discharging the 300-pound batch into the patching area. Smaller quantities may be dumped into wheelbarrows.

The company claims the unit can produce 5 tons of hot-mix per hour and 10 tons of cold-mix per hour, and that it can mix concrete, including low-slump mixes. The dryer is used to thaw as well as dry frozen aggregates.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 421.

Tractor-Wheel Puller

A new chain puller for tractor wheels is announced by Owatonna Tool Co., 331 Cedar St., Owatonna, Minn. It is said to simplify adjustment of tractor rear wheels to the desired row width.

The puller has self-centering hooks with a screw adjustment which is said to give a straight even pull. It is equipped with two 3,720-pound chains, 3 feet long and $\frac{3}{8}$ inch wide, with a grab hook on one end. A $\frac{7}{8}$ -inch forcing screw provides adequate power to pull the toughest tractor wheel, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 415.



Self-centering hooks with screw adjustment are said to give this Owatonna Tool Co.'s tractor-wheel puller a straight even pull.

ASTM Elects New Officers

At its 50th Anniversary Meeting in New York City last June, the American Society for Testing Materials elected officers for the ensuing year. They are: President (one-year term), Dr. Harold Lee Maxwell, Supervisor of Mechanical Engineering Consultants, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; Vice President (two-year term), Norman L. Mochel, Manager, Metallurgical Engineering, Westinghouse Electric Corp., Philadelphia, Pa. Members of the Board of Directors (three-year terms) are: George R. Gohn, Supervisor, Creep and Fatigue Laboratories, Bell Telephone Laboratories, New York, N. Y.; William H. Lutz, Technical

Director, Pratt & Lambert, Inc., Buffalo, N. Y.; Howard K. Nason, Research Director, Organic Chemicals Division, Monsanto Chemical Co., St. Louis, Mo.; Adolph O. Schaefer, Vice President in Charge of Engineering and Manufacturing, The Midvale Co., Nicetown, Philadelphia, Pa.; and Myron A. Swayze, Director of Research, Lone Star Cement Corp., New York, N. Y.

Floor and Roof Erection

A 4-page folder on how to erect Flexicore hollow floor and roof slabs is available from The Flexicore Co., Inc., 1932 E. Monument Ave., Dayton 1, Ohio. On-the-job photographs show every step of laying Flexicore slabs—

from delivery to finish caulking. Comprehensive instructions accompany the picture story.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 467.

Mexican Highway Association Elects New Director General

Jose J. March is the newly elected Director General of the Asociacion Mexicana de Caminos, an organization affiliated with the International Road Federation. Mr. March succeeds Jose Rivera, who resigned recently to take over the post of General Manager of the Ferrocarril del Pacifico, S. A., formerly the Southern Pacific Railway.

NO LAG ON THIS DRAG



In an 8-hour day this Bucyrus-Erie dragline handles about 1,600 yds. of sandy clay on a sewer trench job in St. Paul, Minn. Its 1-yd. bucket makes a swing every 19 seconds.

Steady going like that takes steady power behind it. A "Caterpillar" Diesel D318 Engine delivers that power, and here's what Mr. O. Johnston, Vice President of Walter W. Magee Co., says: "Practically all our equipment is of 'Caterpillar' make. The machines are very well built, they're well serviced and they can be depended upon for many hours of uninterrupted service. We're well satisfied."

Mr. Johnston is only one of thousands of owners all over the country who report the same satisfaction. So specify "Caterpillar" Diesel Engines for your own excavating equipment. Built in the world's most modern engine factory, they give tough, long-lasting service with

low operating and maintenance costs. One example of built-in "Cat" economy: these Diesels operate without fouling on low-cost, non-premium fuels.

And if you need reliable power for any other purpose, the "Caterpillar" Dealer near you can help. See him soon, why don't you?

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Runway Is Extended For National Guard

Grading Contractor Speeds Up His Newest Rubber-Tired Scraper Rigs To Turn Out 15,000 Yards a Day

• BERRY FIELD, Municipal Airport for Nashville, Tenn., is getting a 7,000-foot runway as a result of the National Guard Bureau's mobilization effort. The Bureau let a contract February of this year for a 1,700-foot extension to the north-south runway. McDowell & McDowell of Nashville holds the \$305,000 contract calling for a 1,000,000-cubic-yard fill placement and 700 feet of runway paving.

Work started March 1 with 220 working days allowed for completion. This should be met easily, judging by the pace-setting speed of operations in the early stages of the work.

Fifty-Foot Fill

The work area is a deep depression at the north end of the runway, at the outer edge of the field. The ground slopes down away from the end of the existing runway and then rises again farther north. At the lowest point, the ground is 50 feet below the elevation of the runway pavement. The contract calls for placement of selected compacted fill for 1,000 feet beyond the end of the extended runway for an over-run area; crown width to be 550 feet and sideslopes 7 to 1.

The McDowell outfit moved in with a good-sized fleet of scraper rigs to get the job done in short order. Borrow areas were available on both sides of the extension, so getting the dirt was not a problem and figure-8 loading and unloading was practical.

The equipment was virtually all Caterpillar—5 DW21 scrapers, 6 DW10 scrapers, 4 D6 pushers, 2 No. 12 graders, and 4 D7s pulling the sheepfoot rollers for compacting the fill. The fill was laid in 6-inch lifts, and compacted to better than 90 per cent Proctor by 4 to 6 passes of a Ferguson and a Blaw-Knox 2-drum sheepfoot roller. Very little water had to be added to the sandy-clay soil for optimum compaction. As a matter of fact, spring rains were the big problem—often holding up the job a week or more.

When the job was active, the dirt really flew. The McDowell crews sometimes worked two 10-hour shifts when the weather permitted. Saturdays and Sundays were no exception. The production on this job was over 15,000 yards per day, working an average haul of 1,500 feet. The graders kept a hard tight surface on the haul areas at all times to get maximum speeds out of the scrapers. The Caterpillar DW21's, newly purchased by McDowell, are



C. & E. M. Photo

One of McDowell & McDowell's new Caterpillar DW21 scrapers unloads fill areas on Berry Field, Tenn. At right a Caterpillar D7 tractor pulls a 2-drum Ferguson sheepfoot roller.

powered by B337 diesels with 275-hp peak rating and move along at a 20-mph clip.

All equipment got top servicing. Mc-

Dowell kept a mobile lubricating rig with Alemite pumps on the job. Minor repairs were made at the field shop. A 4,000-gallon diesel fuel tank set on a

rise alongside the haul road provided simple gravity-feed fueling.

Paving 700 feet of the 1,700-foot ex-

(Concluded on next page)

"Motors Cleaner and R"



Clam shell excavators lubricated exclusively by Sinclair

**Owner of 184 Trucks and 230 Pieces of
Equipment Uses Only Sinclair Lubricants**



C. & E. M. Photo

Mobile radio telephones help Bob McDowell (right) and his father Roscoe, Sr., to keep in touch with the field.

tension will be subbed out as soon as grading is completed. The pavement will be 150 feet wide. It will be 3 inches of plant-mixed asphalt on a 10-inch crushed-stone base and 10-inch gravel subbase. McDowell is replacing topsoil taken from the borrow pits over these areas and the unpaved fill areas. A bluegrass tuft sodding will follow.

Personnel

J. B. Register is General Superintendent for the McDowell outfit. L. E. Brockman is Project Engineer. Engineers for the Government on the project are Yokley & Waggoner, Nashville, Tenn.

McDowell & McDowell is a young firm. It was formed in 1946 when the three sons of Roscoe McDowell, Sr., came back from service. The boys, Roscoe, Jr., Charles, and Robert, had construction experience in service and prior to it. The company was set up as a partnership to do house excavation. They started out with a D2 Traxcavator and a couple of surplus Army trucks.

From this modest beginning they have grown into a first-class contracting outfit now doing \$2,500,000 worth of work. Which goes to prove an old adage—there's always room at the top.

A Low-Bed Trailer

A low-bed trailer with 10-ton capacity is made by Alfred Stauffer Machine Shop, Honey Brook, Pa. The A-10 has a bed width of 6 feet 4 inches and a bed length of 16 feet. It rides on four 7.50 x 18 rubber tires and is 14 inches from the ground.

The trailer can be towed by any rated vehicle with a pintle hook. The vehicle takes 40 per cent of the load and the trailer wheels 60 per cent. The four wheels are mounted on rocker arms to give a smooth ride over rough terrain. An 8-inch obstruction will raise the bed only 4 inches. The load is carried below the center of the wheels, providing a stable tow.

The A-10 has a bed of 2-inch oak planking. High trailer sides prevent



The towing vehicle and the Stauffer A-10 low-bed trailer split the load 40-60. The trailer wheels are mounted on rocker arms to give a smooth ride over rough terrain.

equipment from working off the platform. The body is all-welded, with bolts used only in the rocker arm. Only

two men are required for operation, the company points out. The 14-inch height eliminates the need for a high bank or loading ramp.

Standard equipment includes vacuum hydraulic brakes, breakaway cables, and all necessary lighting. A 3 to 4½-ton and a 6-ton model are also made.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 426.

Repair Costs Down"

says

JAMES D. MORRISSEY, Inc.,
of Philadelphia

James D. Morrissey, Inc. is one of the largest diversified operators in Pennsylvania.

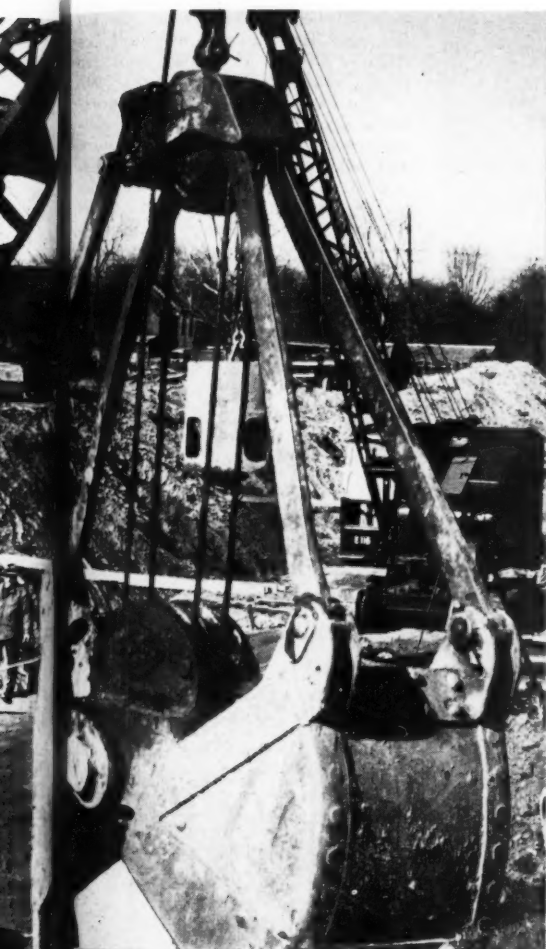
Besides its construction interests, this company owns and operates a large asphalt plant and the Eureka Quarries, where total capacity reaches 4,000 tons daily.

Mr Morrissey, who picks Sinclair Heavy Duty Lubricants for exclusive use in his 184 trucks and 230 pieces of equipment, says:

"Sinclair Heavy Duty Lubricants have proved themselves in two important ways. First, we've saved time and money by being able to standardize our lubricants. Second, we've reduced repair costs due to cleaner motors and lack of sludge accumulation, a problem in some types of our work."

Why don't you learn more about these outstanding heavy-duty lubricants? It will cost you nothing. Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

**SINCLAIR
HEAVY DUTY
LUBRICANTS**



Sinclair lubricants keep this dump truck on the job

Timber-Engineering Courses

The number of colleges and universities that teach timber-engineering has increased 60 per cent or more since 1947, according to Timber Engineering Co., Washington, D. C. During the school year ended last June, the company says, 217 architectural and engineering schools conducted 306 courses in timber construction, as compared with 188 courses in 135 schools five years ago. Since 1937 the number of colleges offering courses in the use of wood as a heavy-construction material has increased tenfold.

Timber Engineering Co., an affiliate of the National Lumber Manufacturers Association, hopes to encourage this trend by supplying free to colleges, on request, technical literature dealing with lumber. Last year the company sent out nearly 50,000 booklets giving data on its three major methods—the Teco connector system, the Lamella, and the glued laminated—as well as a variety of design and construction ideas. Augmenting the booklets are timber-joint display kits.

Interested professors and others should apply to Timber Engineering Co., 1319 Eighteenth St., N. W., Washington, D. C., for information on these free booklets and display kits.

Low-Cost Canal Lining

A 69-page booklet has been put out by the Bureau of Reclamation, called "Canal Linings and Methods of Reducing Costs". It describes in nontechnical language what has been accomplished in the 5½ years since the Bureau initiated its lower-cost canal-lining program and how the changed spex have affected prices.

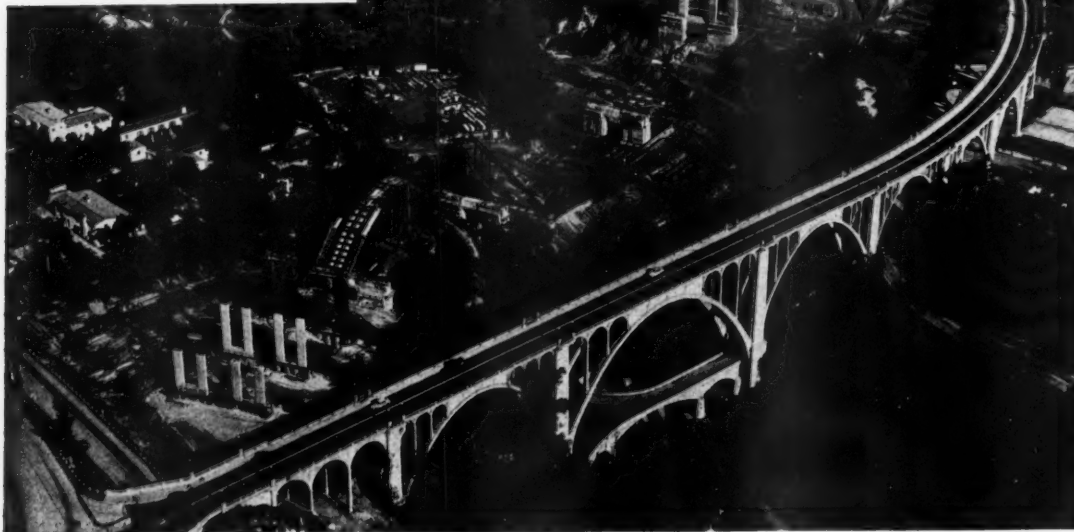
Nearly all linings now placed by the Bureau may be considered as "lower-cost", and since 1946 these include some 24,000,000 square yards in 611 miles of new and existing canals. The booklet estimates total annual savings due to lining of canals at \$2,269,000 in water conserved and maintenance reduced, and \$2,628,600 in increased land valuation and miscellaneous saving.

"Canal Linings and Methods of Reducing Costs" is available for 25 cents from the Superintendent of Documents, Washington 25, D. C., or from the Bureau of Reclamation's Supply Field Division, Code 841, Denver Federal Center, Denver, Colo.

Three-Arch Bridge Carries

Guy F. Atkinson Co. Photo

In the foreground, the old Colorado Street Bridge, and to the left of it, the new freeway bridge under construction.



California Division of Highways Photo

In this scale model, notice how the new bridge complements, gives approval to, the old one, which had to be retained.



Design Problems Complicated By Arroyo, by Heavy Traffic, And by Old Bridge Which Had to Be Retained

By RAY DAY

• **LESS** than a mile south of the Rose Bowl in Pasadena, Calif., a bridge builder's dream is in the making. The freeway it will carry across a well-known arroyo consists of two divided 3-lane roadways, each 40 feet wide. It will replace the old Colorado Street Bridge built in 1912-13 by the City of Pasadena and Los Angeles County.

Usually, when a bridge designer approaches his structure, the bridge is somewhat secondary to the over-all project. In other words, he designs his bridge with an eye to the traffic and the connecting roads, seeking to achieve efficient traffic movement with the utmost economy.

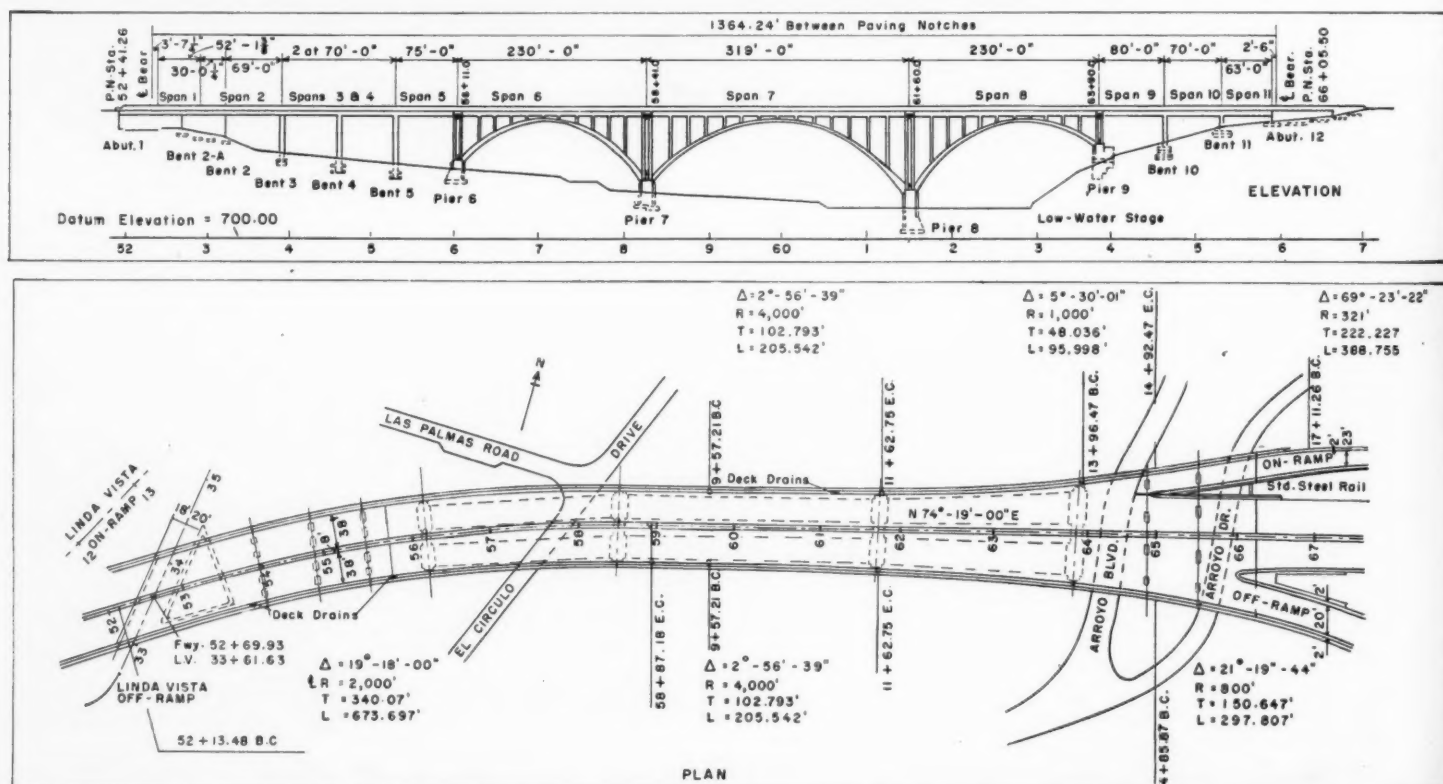
It was not so simple at Pasadena, and thereby hangs an unusual story of bridge designing.

At Pasadena, designers had to span an arroyo 150 feet deep from bridge deck to streambed, and located only a few hundred feet from the main business section of a city of 100,000. Add to that the fact that when the old Colorado Street Bridge was built, Los Angeles County had 15,000 registered motor vehicles; now it has 2,000,000.

Take account, also, of the close proximity of the old bridge, plus the additional headaches caused by curvature, superlevation, excessive width, variation in width, asymmetry of arch ribs and the magnitude of the structure—and the project becomes almost a short course in modern bridge design.

Colorado Street, Pasadena's main business thoroughfare, carries the main traffic from Pasadena to Glendale and points beyond. Until the Arroyo Seco Parkway was built, it carried U. S. 66. The arroyo which the existing bridge crosses, on the western edge of the city, is $\frac{1}{4}$ to $\frac{1}{2}$ mile wide, from 150 to 300 feet deep, and about 15 miles long. The watershed drained by this arroyo extends from the southwesterly San

(Continued on page 25)



Freeway Over Deep Arroyo

Steel Underpinning Supports High Arch Ribs During Pours; Limited Work Space, Buried Utilities Troublesome

• IN the Long Beach office of Guy F. Atkinson Co., key officials waited for the opening of bids on a new 6-lane bridge, 1,364 feet long, across the deep arroyo at the west city limits of Pasadena, Calif. After considerable discussion of Atkinson's \$3,389,650 bid to the California Division of Highways, someone said, "If we get the job, we'll sure come out of it knowing what they mean by 'construction problems'!"

That official's prediction has been accurate. From the point of view of Guy F. Atkinson Co., the construction firm whose bid was low for the project, the new Colorado Street Bridge is one of the most interesting and difficult bridge jobs it has ever tackled. Problems existed in practically every subdivision of the job, as well as in the organization and planning, and in many respects the construction of the bridge has called forth the maximum in ingenuity.

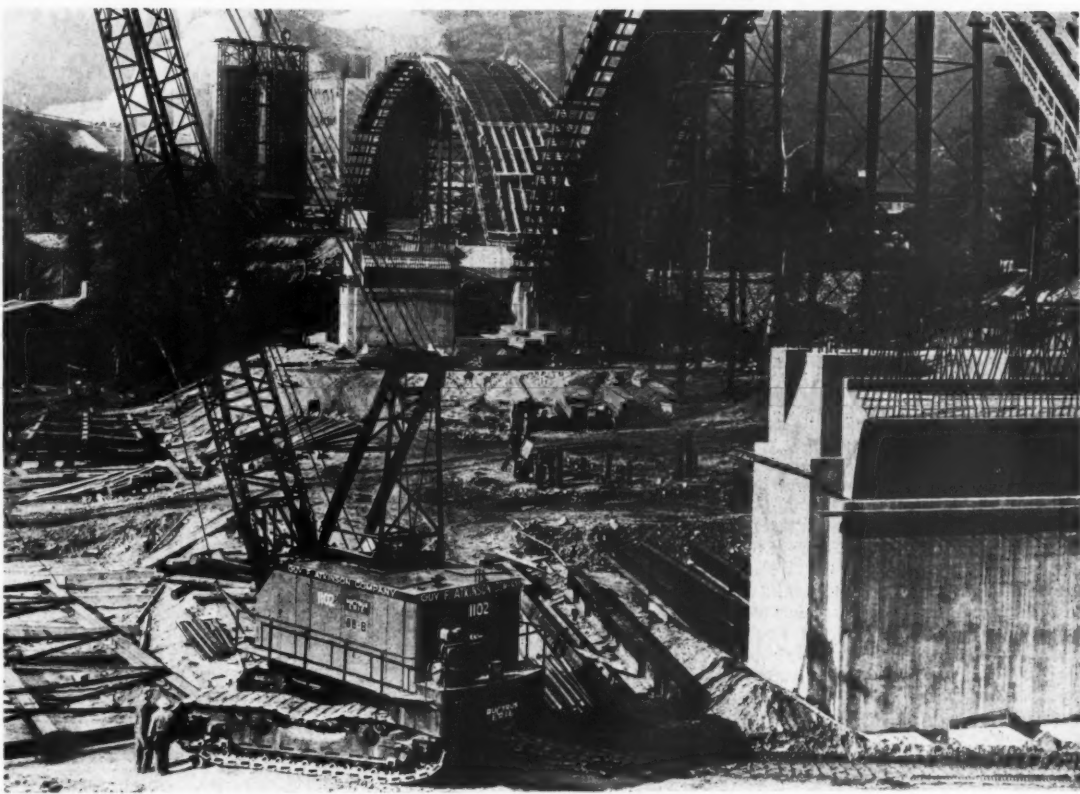
To begin at the beginning—right-of-way was so limited that working room was at a premium, and it was necessary for the company to get an area rezoned so it could buy the piece for establishment of an office and yard. Construction of a bridge whose parts reached up to 150 feet from the streambed presented a constant safety problem. The concrete arch ribs were gracefully designed, but the concrete weighed thousands of tons and had to be supported from underneath on falsework up to 110 feet in height. How these and many other puzzling obstacles were overcome makes the job especially interesting.

Buried Utilities Hinder Work

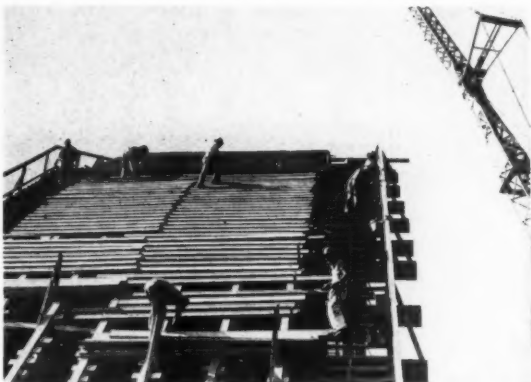
The area underneath the new bridge, for a distance of about 1,500 feet up and down the channel, is one of the last unimproved stretches of the stream, from a flood-control point of view. In years past, the Army Corps of Engineers and the Los Angeles County Flood Control District have tried to

(Continued on next page)

Ray Day Photos



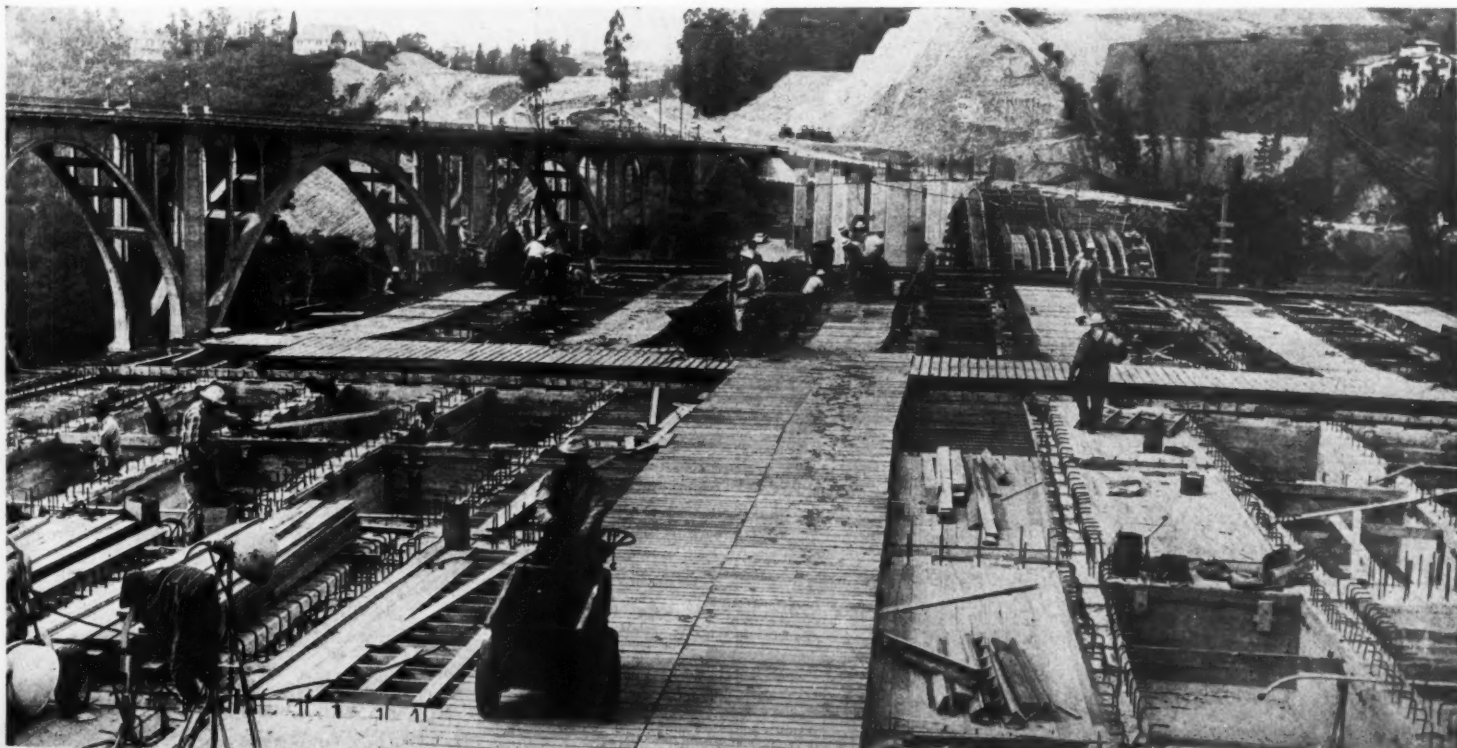
A Bucyrus-Erie 88-B gets ready to lift a piece of the structural-steel underpinning which supported the arch ribs during pours.



Carpenters work high up on an arch rib of the bridge to install planking to take the concrete forms.



Meanwhile most of the steel reinforcing is prefabricated on the ground, to be hoisted into place later by crane.



Concrete is placed on the 6-lane bridge deck by a fleet of Gar-Bro Power Carts, traveling on runways, and vibrated by Viber electric units spotted strategically over the pours.

Steel Underpinning Supports Arch Ribs

(Continued from preceding page)

join this stretch to others improved with concrete channels, but legal water-rights decisions have always prevailed.

At one time the area was owned by the Government of Spain, and later on it was part of a land grant. In recent times, say 30 to 50 years ago, it was a part of a large rancho. During these recent times, water lines and other utilities were laid through the area, many of them unrecorded on any plans. Their presence has made construction a constant headache, especially during excavation. One wing-wall footing, dug along the west abutment, hit no less than 8 utilities lines not shown on any plan.

Before any excavation could be done, the site had to be cleared of oak and eucalyptus trees, along with house foundations from residences formerly within the area. A small labor crew, using two McCulloch chain saws and axes, cut the trees down. The stumps were grubbed by a Caterpillar D8 tractor and its dozer blade. Some of the wood was given to whoever would haul it away, but much of the material had to be clam-loaded into trucks and hauled out, since burning was not permitted on the site. Everybody who worked with land clearing soon got a bad case of poison oak; even Project Manager Bob Boyd managed to get mixed up with the noxious growth which infested the place.

A sizable block of excavation at the east side of the bridge was necessary to make room for access ramps to the flared side of the structure. A Bucyrus-Erie power shovel with a 2½-yard Esco dipper loaded this material to a 10-unit fleet of rented dump trucks, which disposed of the dirt about 2½ miles away.

The pier footings were considerably tougher to dig, because structure excavation here had to go down through mixed overburden and 2 feet into solid rock. The excavation hole at pier 8 was 30 feet deep, and had to be opened up on a slope to make room for twin pier blocks 18 x 32 feet in area.

A combination of methods had to be employed on these excavations. The upper limits of the holes were usually removed by a 38-B Bucyrus-Erie drag-line, assisted when necessary by a D8-drawn LeTourneau K-30 Rooter. The 38-B machine also worked as a drag-shovel, as did a 22-B machine. Ground water became a problem in the center-pier excavations, and because the water was unusually sandy and dirty, conventional centrifugal pumps were not indicated. Six Marlow Mud Hog pumps worked successfully, removing the water and dumping it back to the channel below the bridge.

The excavation in granite was a slow process, consisting mostly of hand work with a small Le Roi compressor and Thor air guns, which handled the sharp steel moil points necessary for penetrating the rock. Blasting was not permitted.

Concrete Work

Concrete work for the new bridge represents a host of procedures and problems. About the only thing which can be said to be typical is the fact that form panels are prefabricated in a central carpenter yard, and the concrete all comes from one central mix plant.

Early in the project, Vice President D. E. Root and Project Manager Bob Boyd decided to organize the formwork and concrete in such a way that as many men as possible could work on the ground instead of up high. This plan, which was vital so far as safety was concerned, called for all formwork to be prefabricated down on the ground, with the only "highclimbing" consisting of actually fitting the forms into place and



Guy F. Atkinson officials discuss some of the worst problems on the Colorado Freeway Bridge job. Left to right, Company Chief Engineer W. T. Colwell, Project Manager Bob Boyd, and (standing) Vice President D. E. Root.

making the final bracing adjustments.

The panels are varied in size and shape, and in several cases the carpenters have made concrete forms for pours 55 feet high in one lift. Two pours, 77 and 88 feet high, were broken by a construction joint. Generally speaking, all exposed concrete is placed against faces formed with ½-inch plywood. This material is nailed to 2 x 6 studs, centered as close as 9 inches depending on expected pressures, with 2 x 6 and 4 x 6 wales. The prefabricated form panels are hoisted to position by a 22-B, 38-B, or 88-B Bucyrus-Erie crane.

A somewhat unusual feature is the fact that form bolts over 20 feet in length are often necessary to reach through the thick pours. For that reason, all bolts are threaded and cleaned at a central point in the yard. Ordinary steel-bolt stock is purchased in bulk, and the form bolts are cut to the proper lengths and threaded at this location. The equipment in this small shop,

(Continued on next page)

You owe it to yourself to check...

**"KOEHRING
WORK
CAPACITY"**



7½ to 79½ TONS lift capacity... 2½ YARDS dipper cap

which is operated by M. C. Hardy, a 20-year employee of Atkinson, consists of an Oster bolt threader, a power wheel with a wire brush, and a steel shear which will snip anything up to $\frac{3}{4}$ inch in diameter.

From a construction viewpoint, possibly the most extraordinary problem has been the support from underneath of the gigantic concrete ribs which span the arroyo. Spans 6, 7, and 8 cover a distance of 779 feet. Spans 6 and 8 are each 230 feet long, while span 7 covers a distance of 319 feet.

After considerable study and discussion, the company settled on a scheme consisting of a structural-steel underpinning framework, which would support half the bridge under construction at one time. Then, after the north half had been built, the underpinning could be lowered a few inches away from the concrete arches, moved south to the other half of the structure, and re-used for that part of construction.

Atkinson's engineering staff is headed by District Engineer W. T. Colwell,

who, with Engineer Fred Wunderlich, worked with the private consulting firm of Moffatt & Nichol, Inc., to design the support members.

Under the 230-foot spans are 3 main steel towers and 2 bents which support the load next to the arch piers. The total weight of steel underpinning in these spans is about 350 tons. Under the 319-foot span are 4 towers and 2 bents, with a total weight of over 400 tons. Some of the towers are 110 feet high.

The 10 main towers consist of 6 columns, made up of 12 and 14-inch structural-steel beams. These towers were fabricated on the ground, cross-braced for sway stability, and hoisted to position by the 88-B crane, which used a 2-part hoist line from its 130-foot boom. The steel towers are set on a series of screw-type jacks, with 4 jacks under each of the 6 columns in a tower. The jacks rest on reinforced-concrete pads, and for additional bearing while they are in place, are enclosed in dry-packed concrete. When

the time comes to lower the jacks, this concrete can be easily chipped away.

The towers are spanned longitudinally by 36-inch WF girders, weighing 230 to 300 pounds per linear foot, and these in turn are topped by 12-inch steel purlins, wood blocking, stringers, and camber strips to make the contour of the arches. The arch soffits are formed by $\frac{5}{8}$ -inch plywood.

Solid planking was placed between the 36-inch beams, supported on the bottom flange for safety reasons. It was noted that men worked faster and more efficiently after the material was in place and they could no longer see the ground far below. Catwalks were constructed with strong guardrails as the arches were formed. The only way a man could fall off now would be to crawl out over this guardrail.

Under the flared east deck, landward from the arch ribs, a support framework of wood piles was tied together by wooden bracing placed every 10 feet. The support framework was especially designed for easy stripping.



Acrow patented shores supported the concrete ramp decks for the 28 days required to build their strength to design standards.

Underneath the ramps, patented Acrow shores supported the slab during its construction. These shores were of course easily removed when the work was completed.

An especially interesting problem presented itself on the flared east deck when a crane came to the limit of its reach in setting form panels for the deck cells. There was still over 150 feet to cover, and the only crane which could reach over that distance was the 88-B. Considering the relatively small size of the panels, the use of a crane that big would have been foolish.

A small Lorain Moto-Crane then moved in to the deck already built, and a cableway line was laid from the boom point sheave out to the limit of the flared deck. The highline was anchored at that point. The panels were then picked up, rigged to the sloping highline on a pulley, and slacked off to their position in the deck cells. The use of this highline speeded the setting of forms immeasurably and hastened concrete work on the tricky east deck.

Mixing and Placing

Because of the lack of working space and certain building restrictions in the area, it was necessary to establish the batch plant about 2 miles from the project, near the corner of Washington and Lincoln Boulevard, in Pasadena. San Gabriel Valley Ready-Mix Concrete Co., which already had a plant set up near this point, consented to set up Atkinson's full-automatic Noble batch plant and operate it, using the aggregates and cement purchased by Atkinson from Graham Bros. and Southwestern Portland Cement Co., respectively.

The Noble plant consists of a 150-ton 4-compartment bin and a 400-barrel cement silo. Aggregates come in three sizes: $1\frac{1}{2}$ -inch minus, $\frac{3}{4}$ -inch minus, and sand. Victor cement is used, and the batch consists of a 6-sack mix designed to give 3,500 pounds of compressive strength at 28 days. The materials are batched dry and delivered to a fleet of Willard truck mixers which haul to the bridge.

At the bridge, the concrete is usually handled to the pours by cranes—the 88-B, 38-B, or 22-B Bucyrus-Erie. Some of the pier foundations were placed directly from the truck mixers, but the size of most of the pours nearly always called for the use of transfer cranes.

For small pours where the 38-B is in service, a 1-yard Gar-Bro concrete bucket is used. When the 88-B places concrete, as it does on all the high spandrel columns and arch ribs, a 2-yard Gar-Bro air-release-dump bucket is used, with a Rud-O-Matic tagline to control its position. A 25-foot compressor mounted on the 88-B charges the dump cylinder of the bucket each

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With any crane or excavator, all mechanical features, operating advantages, speeds and capacities add up to one deciding factor... cost per ton lifted or yard moved. Make sure you get the biggest profit advantage; ask your Koehring distributor for specific figures on "KOEHRING WORK CAPACITY".

KOEHRING COMPANY MILWAUKEE 16, WISCONSIN
Subsidiaries: Johnson, Egan, Smith

Steel Underpinning Supports Arch Ribs

(Continued from preceding page)

time it is filled with concrete. When the bucket gets in position for dumping, the crane operator releases the material at a signal from the concrete foreman. This bucket has also helped to hold down accidents by relieving a man from what would normally be a hazardous spot.

The bridge deck is being placed by a fleet of 5 Gar-Bro Power Carts, working on wooden runways from a 2-compartment Gar-Bro transfer hopper. The truck mixers dump directly to this hopper, and two of the Power Carts can load at once. As the concrete goes in, it is vibrated by Viber electric vibrators, strategically placed over the pours.

Project Manager Boyd solved a headache by using about 12 small 5-kw Wisconsin-driven Master electric generating sets around over the bridge. These machines furnish lights, drive the vibrator motors, power small SkilSaws and drills, and make it unnecessary to string power lines in a cramped area where they would be in the way of the cranes.

By March 1, 1952, the bridge was well ahead of schedule, and the first pours had been made on the arch ribs. This had been done in accordance with a placement routine which calls for completion of the central arch span ribs first, followed by the ribs at either side. It takes 6 pours to form each rib, and falsework remains in place 28 days while a water cure is applied. The bridge is expected to be open to traffic early in 1953.

Supervisory personnel for Guy F. Atkinson Co., in addition to Vice President and Area Manager Root, Jim Draine, Assistant Area Manager, Project Manager Boyd, and Engineers Colwell and Wunderlich, includes Project Engineer Brick Marsh, Construction Superintendent Paul Paulson, Carpenter Superintendent Ray McLellan, Excavation Superintendent Ray Heinze, Labor and Concrete Foreman Ed Scharer, and Office Manager Don Snyder.

(For a companion article on the design of the bridge, return to page 20.)

Blacktop Men Hold Forum

As part of a series of district meetings planned by the New York State Bituminous Concrete Producers Association (see C. & E. M., June, 1952, pg. 16), some 75 New York State Department of Public Works engineers—city, county, and township officials—got together with Association members at a round-table forum last June in Garden City, N. Y. The subject under discussion was District 10 (Suffolk, Nassau, and five counties of New York City) and the current road needs and problems confronting it.

With District Engineer J. J. Darcy acting as moderator, members and guests listened to reports and joined in a question-and-answer period. Gus Rayner, Albany, Executive Secretary of the Association, quoted some figures on bituminous-concrete construction throughout the state during the past year. As compared with 1951, he said, blacktop tonnage for state work alone (not including city, county, township, or private work) has increased 43 per cent to a total of some 939,000 tons. Mr. Rayner looks for a total of 1,250,000 tons this season. There are some 64 permanent mixing plants in New York State and about 2,800 throughout the U. S. According to Mr. Rayner, there will be plenty of work for these, as some 43,000 miles of Federal-Aid highways wear out every year and have to be replaced, and it is estimated that \$7 billion a year for the next 15 years will be needed to pay for their upkeep. As for District 10, about 60,000 tons of



District Engineer J. J. Darcy (left) shows great interest in Gus Rayner's point. They are discussing New York State's blacktop program for 1952 during the meeting held in Garden City last June.

blacktop will be used on all its projects during 1952.

The Association has pledged its full support to the New York State Department of Public Works and every effort will be made to take care of the heavy requirements of the state highway program.

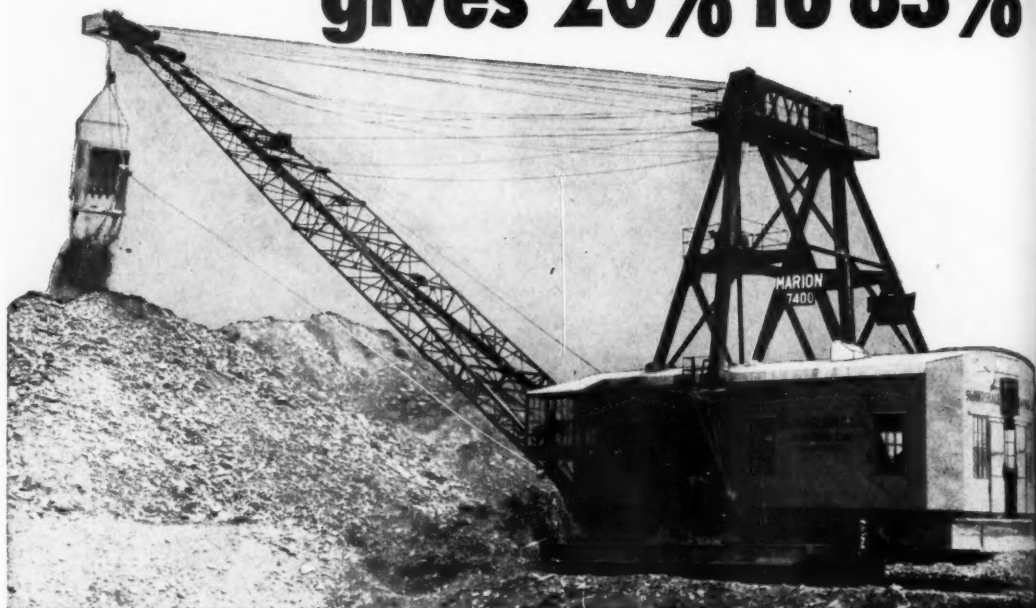
Data on Mobile Machine Shop

A mobile machine shop is described in a new bulletin issued by Cemco Industries, Inc., First National Bank Bldg., Galion, Ohio. It illustrates both the truck and trailer-mounted unit complete with all standard tools and equipment.

The Cemco machine shop carries a lathe, welding apparatus, a grinder, vise, generator, forge, compressor, power takeoff, and portable drills. A large number of tools and repair kits are also furnished.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 408.

New American Tiger gives 20% to 83%



SAVES MONEY AND TIME—INCREASES PRODUCTION. This new Tiger Brand Drag Line Rope quickly pays for itself through increased life and greater production. Try it next time you have to replace your drag rope.

20% INCREASE IN WIRE ROPE LIFE. When this 14 cu. yd. drag line was equipped with the new Tiger Brand 2 1/4" Drag Line, the average service life of the rope was increased 20% over other brands tested.



Three-Arch Bridge Over Deep Arroyo

(Continued from page 20)

Gabriel Mountains to Los Angeles River, meeting about 2 miles north of Los Angeles City Hall. The watershed is controlled by Devil's Gate Dam upstream from the Rose Bowl, and by concrete-lined channel sections below Pasadena. At the bridges, no improvement work has been done on the natural channels.

At the new bridge site the arroyo is 1,500 feet wide and 170 feet deep from the canyon bottom to a flat plateau on the east side. A higher range of hills faces the western approach. Generally speaking, the site was covered by eucalyptus and oak trees, with homes nestled among the trees in all but the lower levels of the ravine.

The old Colorado Street Bridge, still serviceable within its width limits, is composed of 9 concrete arch spans and a concrete approach viaduct at each

end. Its total length is 1,460 feet. Its deck, 150 feet above the channel floor, has been the jumping-off point for so many human beings bent on self-destruction that it merits its name, "Suicide Bridge". Nevertheless, it is an impressive, pleasing structure.

Its presence was a problem, however. In the first place, it could not be removed because it has extreme value as a service or frontage road along the freeway. The Rose Bowl, only a mile from the site, is accessible by Linda Vista Avenue and Arroyo Boulevard, so the old bridge had to be left to help that traffic. In the second place, it flaunts architectural "cheesecake" too costly to reproduce in today's labor market. And quite apart from cost, it would have ruined both bridges, architecturally speaking, to repeat the ornate details in the new bridge. It was within these existing conditions that California's bridge designers worked.

Many Bridge Types Studied

In an effort to get economy, traffic-

carrying capacity, and a pleasing architectural effect, they considered many bridge types. Arch bridges of 3, 5, and 7 spans, each with 2, 4, 6, or 8 ribs were studied. The Roman viaduct style was taken under advisement. How about long steel-beam spans, and deck trusses on high piers? Or box girders on round, modernistic, concrete pier shafts? Actually, the latter type fitted the site well, but the engineers quickly decided it was too much of a contrast with the existing multi-arch structure.

Arch bridges of 5 and 7 spans were too near the general arrangement of the old bridge to look right, because there was a decided difference in the profile of the two crossings. The short arch spans looked like hunchbacks; they had too much height for their length. The wider roadway made them incongruous.

A 3-arch span with a single deck—the type finally picked—is the same general style as the old bridge, but it has enough numbers and sizes of spans to give a pleasing contrast. There is no

harsh architectural clash.

"I want this new bridge to give mute approval to the type originally selected in 1913," explained one designer. "It must be a natural development from the smaller, more ornate architecture of the past to the larger and plainer architecture of the present."

One of the contractor's foremen, when he was told of this objective, said, "You know, he done it too, didn't he?"

To convince that man, the designer finally made two ribs, and the pier shafts wide transversely but relatively thin in elevation. Spandrel columns were built in the same proportion to play down the massive members required for the wide roadway and ponderous loads the bridge will carry. The number of parts was even decreased to maintain harmony in appearance.

Detailed Design Problems: Deck

Ramps became the No. 1 headache with the design of the bridge deck, for a separation is needed at the east end of the project to carry the Colorado Street on-ramp over the freeway. To accommodate these ramps, which begin in the middle of the bridge, the bridge width varies from 93½ feet at pier 7 to 171 feet 4 inches at abutment 12. For an additional complication, a 2,000-foot-radius curve had to be thrown on the westerly 650 feet of the bridge. That curve extends beyond the first 230-foot arch span.

Due to this curve on spans 6 and 7, and the variable spacing of longitudinal beams on spans 7 and 8 (due to the flared east end), the deck design was made more difficult because of the cantilever of the deck slab from the exterior girder. The length of this cantilever arm varies from 9 to 14½ feet, with bending moments up to 50,000 foot-pounds. Previous experience with lighter structures made the designers yell "Whoa!" They knew this was likely to lead to considerable deck cracking, due to the elongation of reinforcement bars. These cracks are at first merely unsightly, but they lead to progressive failure.

To whip the problem, the designers lowered the allowable working stresses in tensile reinforcement below AASHTO specifications. Longitudinal distribution of wheel loads was then increased by adding, to the usual slab-reinforcement bars, a girder-type curb and rail. It was secured to the edge of the pavement with stirrups. The area of tensile reinforcement was computed on the basis of a balanced slab design with allowable stresses of 1,000 psi for concrete and 18,000 psi for steel reinforcement.

The slab thickness was then increased to reduce the maximum concrete and steel stresses to 750 and 13,500 psi, respectively. This method was unusually economical, because it maintained the maximum spacing of reinforcement bars. Under prevailing prices, and the way Sacramento headquarters grows about steel priorities, concrete is much cheaper to use than steel.

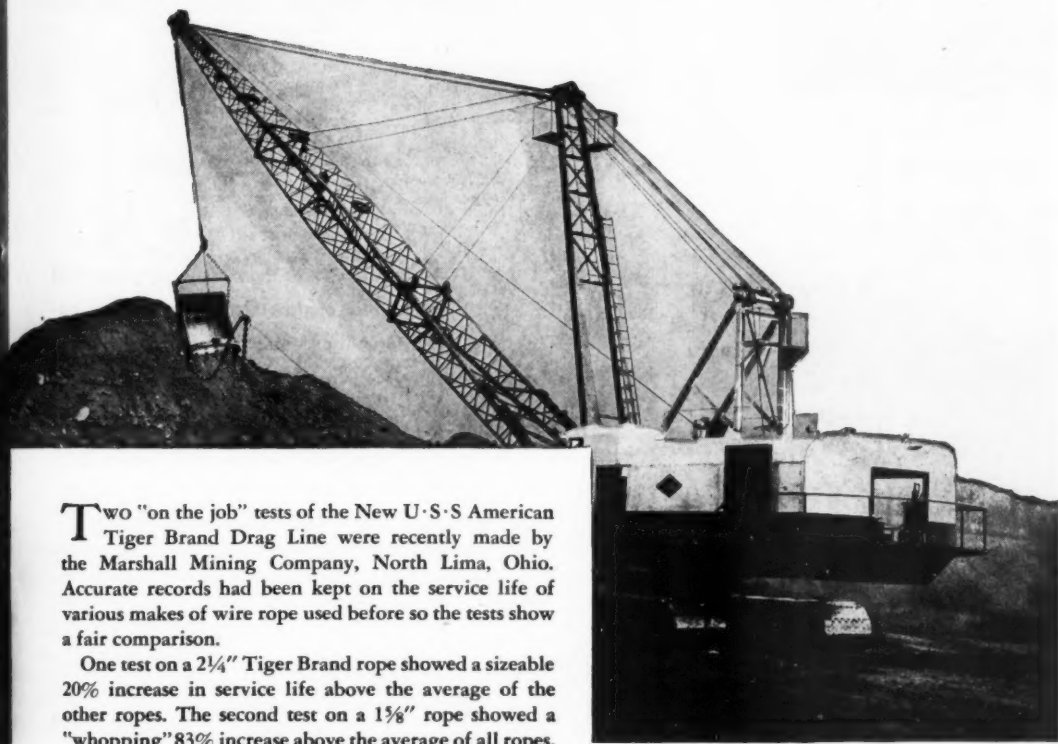
Interior Deck Panels

Interior deck panels were computed for standard allowable working stresses. A variation was the use of 4-way reinforcing for the slab, because many of the panels are almost square. The longitudinal expansion joint, which is almost always necessary to decrease transverse temperature stresses in very wide bridges, was also eliminated.

This bridge differs from the usual wide structure, which is generally set on short rigid columns with little possibility of movement without critical temperature stresses developing. The columns of the Colorado Street Bridge are either long and relatively flexible, or they are attached to elastic arch ribs with a resultant freedom from excessive

(Continued on next page)

Brand Drag Line increase in service life



Two "on the job" tests of the New U-S-S American Tiger Brand Drag Line were recently made by the Marshall Mining Company, North Lima, Ohio. Accurate records had been kept on the service life of various makes of wire rope used before so the tests show a fair comparison.

One test on a 2¼" Tiger Brand rope showed a sizeable 20% increase in service life above the average of the other ropes. The second test on a 1½" rope showed a "whopping" 83% increase above the average of all ropes. Digging conditions in all cases were the same.

This new Tiger Brand Drag Line was designed especially to resist the severe operating conditions imposed by this class of service.

The use of this new rope on your drag line will mean substantial savings in your wire rope costs. It will cut your down time and help to keep machines at top capacity.

DRAW LINE LIFE INCREASED FROM 600 HOURS TO 1100 HOURS —83%. The best service on this drag line using 1½" rope averaged 600 hours for other brands of rope. But with the new U-S-S Tiger Brand Rope, service life jumped to 1100 hours—almost double the previous average.

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Three-Arch Bridge Over Deep Arroyo

(Continued from preceding page)

stresses due to temperature movement. Since the structure is in an active earthquake zone, the engineers felt that monolithic construction was more im-

portant than an expansion joint.

Arch-Rib Design

A very special problem was the planning of the arch ribs which help to carry the three main spans. Consider the problem from these angles:

No. 6 is a 230-foot span on the center line of a 2,000-foot-radius curve, with

the left rib 5½ feet longer than the right. No. 7 is a 319-foot span, with 45 feet on the previous 2,000-foot curve. The major portion is on the flared roadway, which requires a variation of 7 feet in the distance between the arch-rib ends to compensate for the increased width. No. 8 is another 230-foot span, all of which is on the flared section.

The rib centers are 55 and 70 feet apart at piers 8 and 9, respectively. They had to be varied from 24 to 32 feet wide to get proper column spacing for the deck structure. No two points of springing are at the same elevation, and therefore all the arches are unsymmetrical. The engineers scratched their graying heads and tried desperately to come up with a symmetrical center arch, but a 12-foot elevation differential between the two ends knocked that noble dream into a cocked hat.

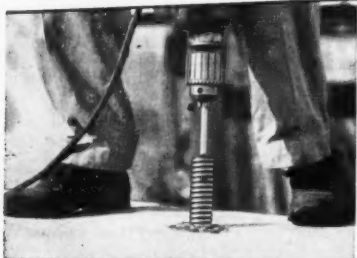
To top it off, the whole bridge is on an ascending grade of 1 per cent, giving unequal column loads at what would usually be corresponding points. This

difference was further spotlighted by the increasing width and heaviness of superstructure, and the widened rib in span 8.

A trial rib was selected by using elliptical segments for the arch axis; then a dead-load-force polygon was drawn. The first polygon was disconcerting, for there were more than the usual discrepancies between polygon and axis, and the selection of the correct axis depended on adjusting the location of the crown as well as changing the rise-span ratio of the unsymmetrical arch rib. Rib axes were determined by the use of a grid system. It was based on axes for two assumed positions of crown and rise ratio, which would enclose the correct rib axis. By computing the elevation of the quarter point for the several positions of the crown—and different rise ratios—it was possible by interpolation to select an axis conforming to the dead-load-force polygon.

On span 6, the choice of these two (Continued on next page)

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trial axes was not wide enough to enclose the true axis, but the location of the latter was determined by extrapolation. These methods saved many days of design time. Usually, in establishing a multicentered arch axis, engineers worry with the old "cut and dry" method.

Curbs—Box Girders

Design of the curb was influenced by two considerations, safety and strength. What the designers had in mind principally, in addition to the distributing beam effect, was the average California automobile driver: that wild-eyed sport-jacket-clad maniac who would be sure to jockey for position at the on-and-off ramps in the center of the bridge, where it is 135 feet to the streambed below. They could visualize the weaving high-speed traffic, the blaring horns, shouted cusswords; even the unladylike behavior of the women drivers. And they decided they'd better make those curbs stout.

A standard rail, designed for 300 pounds of horizontal load to the foot, would be like a row of empty orange crates at this point. A safety curb with a heavy horizontal rail above the double 9-inch curbs was modeled, but it looked bad. The final design consists of a reinforced-concrete curb 27 inches high, with the 9-inch steel member reduced to a minor portion of the rail. This gives 3 feet of extra-strong safety curbing, is better looking, and will be a good load-distribution beam.

On the box-girder approach spans, the assumption of longitudinal deck beams as T-beams was no good. Heavy cantilever slab stresses, large negative moments, and dead-load shear reactions were induced in the exterior beams, as well as torsional stresses which could not be resisted either by T-beams or by L-beam curtain slabs originally proposed. Box girders were therefore designed to carry these stresses over the outer columns and, for uniformity, were also used over the interior columns. This greatly improved the final appearance of the bridge by adding to the visible dimensions of the beams.

Columns and Piers

There was no particular problem so far as column spacing was concerned, because a granodiorite foundation capable of supporting 20 tons per square foot underlies practically the entire area. Pier 8 is unusually massive and spectacular. It consists of twin pier blocks 60 feet high and 18 x 32 feet in cross section. Approximately 2,500 cubic yards of concrete are in the pier footing alone, with another 1,000 cubic yards in the columns. The 100-foot-high pier shafts are divided into 4 columns above the base. Structurally, they are flexible enough to allow temperature movements without developing critical stresses or needing expansion devices, as a solid shaft would.

Final Dimensions

The final design of the new Colorado Street Bridge is the answer to all these problems. The final design shows a bridge 1,364 feet long. It is 93½ feet wide at abutment 1 and 171 feet 4 inches wide at abutment 12. At span 8, the deck is 130 feet above the streambed.

The clear spans of the arch ribs are 214, 302, and 214 feet respectively. The ribs for spans 6 and 7 are 24 feet wide, while the rib for span 8 varies from 24 to 32 feet. Crown thicknesses are 2½ and 3 feet for the 230 and 319-foot spans. Skew-back thicknesses are 4 feet 3 inches and 4 feet 8 inches for high and low ends, respectively, of spans 6 and 8, and 5 feet 4 inches for span 7. There will be 5,500 cubic yards of concrete in the arch ribs, 5,300 cubic yards in the arch piers and footings, and 32,000 cubic yards in the main bridge. About 6,000,000 pounds of steel reinforcement will be used in the

structure.

At its peak, the bridge is expected to carry 3,100 vehicles per hour on its twin divided roadways, separated by an 8-foot dividing strip. There will be no provision for pedestrians, except a stairway down at the east end to let people go to Linda Vista Avenue.

The bridge will cost approximately \$3,500,000 but, in spite of the fact that it is the costliest non-toll bridge ever built in California, the designers believe they achieved the maximum economy consistent with the traffic-handling job at hand.

Personnel

The entire project is under the general supervision of George T. McCoy, State Highway Engineer, and F. W. Panhorst, Assistant State Highway Engineer (Bridges). J. W. Green is in charge of Bridge Department activities in Southern California. P. O. Harding is Assistant State Highway Engineer in District VII in which the bridge is located.

(Concluded on next page)

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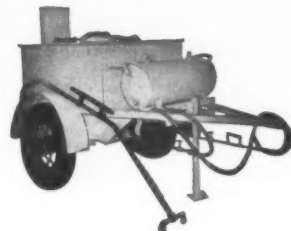
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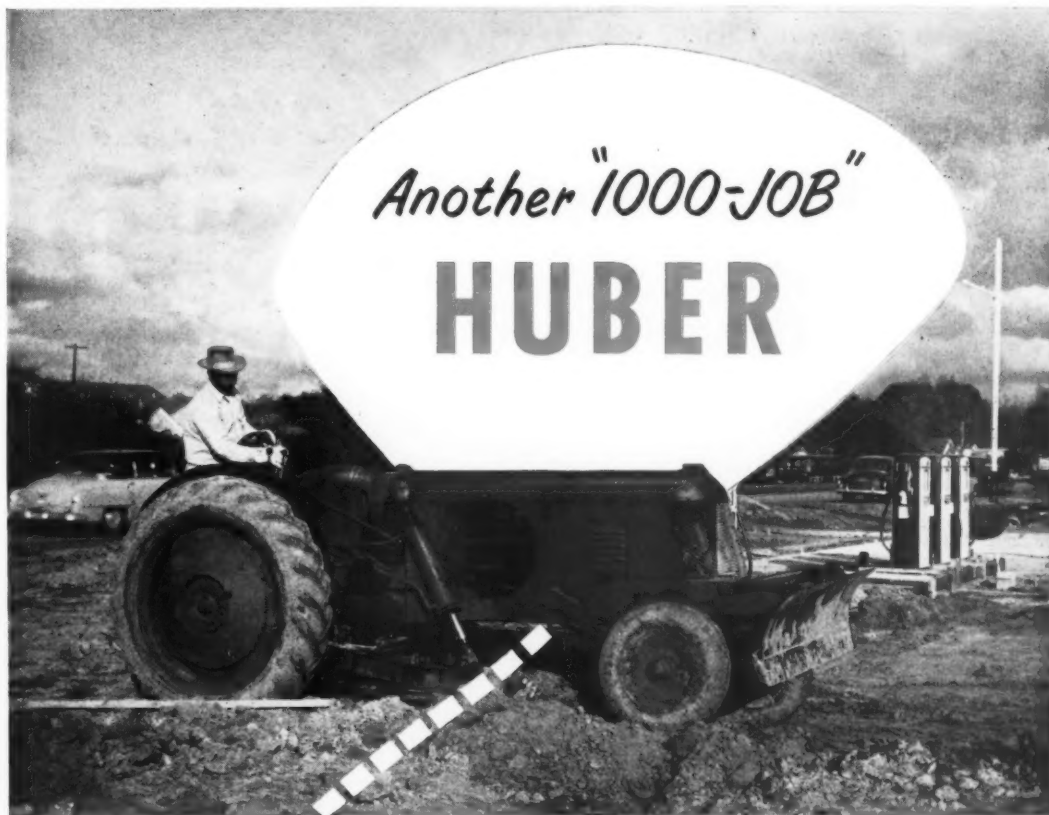
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Three-Arch Bridge Over Deep Arroyo

(Continued from preceding page)

cated. H. R. Lendecke is the Resident Engineer in charge of the project.

Engineering designers who actually worried with the thing from start to finish include H. C. Van der Goes, architectural studies; H. E. Kuphal, original design; C. H. Darby, final design after Mr. Kuphal's retirement in 1948; C. W. Jones, preliminary investigation; R. S. Barker and P. H. Bowen, arch-span and pier design; and R. E. Fetter, approaches and auxiliary structures.

(For a companion article on the construction of the bridge, return to page 21.)

Reinforced Membrane For Waterproofing

A waterproofing and anticorrosion membrane built around a woven spun-glass ply has been developed by Rubber & Plastics Compound Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y. Nerva-Clad is composed of spun glass, synthetic rubbers, and asphaltic hydrocarbons. The reinforcing glass fiber is said to provide a tensile strength of 80 pounds lengthwise and 60 pounds crosswise.

The membrane can be applied dry directly to structural steel, concrete, masonry, or piping. On walls it is applied with hot asphalt or cold fibrated mastics. It may be placed in direct contact with steel beams, the company points out.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 416.

River-Harbor Board Golden Anniversary

For 50 years all Congress-authorized river, harbor, and flood-control projects have been screened by the Board of Engineers for Rivers and Harbors. In its golden-anniversary year it is appropriate to look at the work which this senior board is doing in the investigation of the economic and engineering aspects of all projects under the jurisdiction of the Corps of Engineers.

The Board, whose procedure was set up by the River and Harbor Act of June 13, 1902, consists of senior officers of the Corps of Engineers, selected for the assignment because of their knowledge of and experience in river and harbor and flood-control work. From 1824 until 1902, reports called for by Congress were prepared by the district and division engineers and forwarded to the Chief of Engineers for review and submission. The establishment of the Board, however, made it possible to apply to all reports uniform basic policies and methods of determining engineering and economic elements. The thorough review to which the Board subjects all projects is indicated by the high percentage of unfavorable recommendations it has made. For instance, during the period 1930 through 1950, the Board reviewed 3,177 projects and reported unfavorably on over half.

The Board, which consists of a chairman, five officers, and a resident member, goes to work in the following way. It usually holds a meeting about every four weeks, each meeting lasting for two or three days. If requested (and they nearly always are) public hearings are held at these meetings. Local interests concerned with water resources often send delegates to support or oppose projects recommended or unfavorably reported on by the field offices of the Corps of Engineers. Under the direction of the Board's resident member, its technical staff submits each project to comprehensive study and



U. S. Army Photo

Left to right, seated: Brig. Gen. Don G. Shingler; Lieut. Gen. Lewis A. Pick, Chief of Engineers; Maj. Gen. George J. Nold, Deputy Chief of Engineers and Chairman of the Board of Engineers for Rivers and Harbors; Col. Wendell P. Trower. Standing: Col. Emerson C. Itchner, Col. Chester K. Harding; Col. H. B. Cole, Resident Member; Col. Paschal Strong, Executive Secretary Ben Walker.

analysis, relating estimated cost to estimated benefit. The Board's report is then forwarded to the Office of the

Chief of Engineers; and the Chief of Engineers prepares from it a report to Congress, which is submitted to the

states concerned, the other Federal agencies involved, and the Bureau of the Budget. With the comments of all these agencies, it then goes to Congress through the Secretary of the Army.

Another function of the Board of Engineers for Rivers and Harbors was assigned to it in 1920. This is to compile, publish, and distribute useful statistics, data, and information concerning water transportation and related facilities, including reports on the movement and type of commodity of all the waterborne commerce of the United States. In addition to this, the Board publishes a series of reports on individual domestic ports, terminal facilities, and transportation lines, and prepares classified studies on foreign ports.

Frank S. Salchenberger Dies

Frank S. Salchenberger of Chicago, Ill., died on June 20 at Evanston, Ill. He was for many years Chicago District Manager of Morris Machine Works, Baldwinsville, N. Y.

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Moscow

Caterpillar Opens New Plant at Joliet

Caterpillar Tractor Co., Peoria, Ill., held a press and radio open-house preview last May of the company's new plant at Joliet, Ill. Part of a three-location expansion program—other construction is under way at Peoria and at York, Pa.—the Joliet plant helps answer the demand for bulldozers, rippers, wagons, scrapers, and cable controls, which are all to be manufactured there. Another important function it fulfills is to provide parts for Caterpillar machines.

Construction at Joliet began on March 3, 1950, and the first machine was produced there less than a year later on February 12, 1951, even though the plant was not complete. The entire property consists of 305 acres. So far the construction completed is a manufacturing building covering 662,400 square feet, which will be extended early next year to provide a total manufacturing area of 891,000 square feet.



An air view of Caterpillar's new Joliet, Ill., plant. Manufacturing facilities already cover 662,400 square feet, and 230,000 square feet more (left center) is under way. The 280,000-square-foot Parts Building will be located in the center of the photo near the Des Plaines River.

In addition to this, two smaller service buildings will be erected by next month and a parts department is planned, covering 283,000 square feet.

Henry H. Howard, Director of Sales,

told press and radio representatives at the open house that Caterpillar's sales in 1951 totaled about \$394,000,000 but that with Joliet in full production and other expansion programs nearing

completion, the company foresees \$750,000,000 as its sales potential, should market conditions continue as they are today.

ASCE Is Optimistic On Future Progress

The American Society of Civil Engineers has come a long way in its first 100 years, and its centennial year 1952 is the occasion for many backward glances at outstanding past achievements such as the introduction of steel and concrete, which made possible longer bridge spans and heavier loads; mechanization of hand tools and horse-drawn equipment; the use of electric power; rapid transportation by road, rail, and air due to the internal-combustion engine; and purification of water, with the virtual elimination of water-borne diseases. But the ASCE is not content with looking backward. It envisages the next quarter century as an era in which people in dry areas may drink sea water, we will all breathe clean air, and atomic energy will be used for purposes other than destruction.

At the various centennial meetings the Society is holding this year, there has been discussion of these and other aspects of future engineering. Chairmen and members of technical divisions of the ASCE predict that not only will potable drinking water from the sea become a practical possibility, but sea water will also be used for irrigation. Commercial use will be made of sewage sludge; there will be control of atmospheric pollution and of wastes from atomic-energy industry. The study of soil mechanics, too, is expected to lead to the use of soil as a vital construction medium. As for electric power, Society members regard development of the hydraulic turbine as a top advance during the past century and predict that in coming years there will be an increase in the radius for economic transmission of power and a resulting interconnection of systems. This will be achieved through the development of equipment to control higher voltages necessitated by new hydroelectric plants more remote from the load centers.

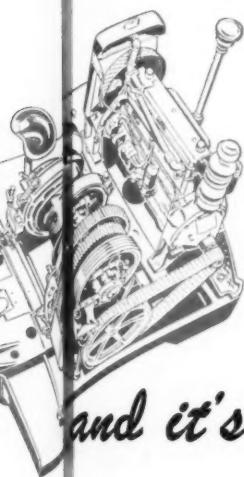
In the field of transportation, the creation of modern urban freeways and toll turnpikes has been an important development in the recent past, and it is foreseen that high-capacity highway systems will soon be integrated for mass transit as well as individual travel. Surveying and mapping will be greatly helped by electronics in coming years, the Society thinks. Waterways will be able to carry greater tonnages due to larger locks for the handling of tows in single rather than in multiple lockage. As to air transport, greater safety in landings and takeoffs is sought through advancement in runway and taxiway design due to the special needs of jets.

The ASCE believes in shaping events, and members hail the increasing number of engineers now being elected to public office and the greater use of engineers in the management of the American economy.

Data on Fastening System

An 8-page booklet on the Tru-Set line of fasteners and accessories has been released by Ramset Fasteners, Inc., 12117 Berea Road, Cleveland 11, Ohio. Described and illustrated are light and heavy-duty powder-actuated tools and their carrying kits, and the booklet points out what type fasteners and powder charges should be used with each model. It lists some 20 accessories and fixtures and cites their applications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 463.



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Gas Pipeline Crosses The Mississippi River

Natural-Gas Pipeline Company Wins Battle With High Waters, Current; Pipe Laid on Schedule

• WHEN talk turns to the toughest part of laying pipelines, construction men will tell you without hesitation that it's making a river crossing. And which river crossing has been among the toughest of all? The crossing of the Mississippi River from Grand Tower, Ill., to Wittenberg, Mo., for Texas-Illinois Natural Gas Pipeline Co. of America. At least, that's the opinion of M. T. Willhite and L. A. "Friday" Davis, of Midwestern Constructors, Inc., Tulsa, Okla. Watching progress of the crossing last December, they said, "This is it!"

Getting three separate lines of 20-inch pipe across 3,000 feet of unpredictable river to Wittenberg on the Missouri bank was certainly the roughest work Midwestern Constructors had to face in the 400 miles of construction work it did on the 1,340-mile pipeline. The company had to fight abnormally high waters and the river current all summer long, from the very beginning of the project in June of last year. With the coming of winter, ice surged down the channel to make the work even more hazardous as far as equipment and lives were concerned.

But by December 1, as scheduled, the new "big-inch" pipeline was in service, with one of three lines successfully across the river. The three underwater lines, of smaller diameter than the land line, will give the pipeline its planned pumping capacity, plus a safety factor not present had only one line been used.

The Mississippi crossing was the last link in a pipeline that can supply the Chicago area with natural gas at the rate of 524,000,000 cubic feet daily, at full capacity from gas fields at La Gloria, Chocolate Bayou, Old Ocean, and Von Blucher, all in Texas, between Houston and the Rio Grande Valley.

Other river crossings on the part laid by Midwestern are on the Illinois River at Morris, Ill., the Kaskaskia River at Sullivan, Ill., and the Sangamon River at Monticello, Ill.

Dredging

A riverbed path 20 to 40 feet deep and 200 feet wide was dredged for the pipeline by the G. A. McWilliams, a cutterhead dredge, and the Arkansas, a sand-sucker dredge, both of the McWilliams Dredging Co., New Orleans, La. Barges and derricks were supplied by Vollmar Bros. Construction Co., St. Louis, Mo.

Underwater Pipelaying

The first section of underwater pipe was 1,500 feet long. It was set on tiny cars on the railroad track which had been laid down the east bank in a 26-degree grade to the river. A watertight plug was welded to the leading end. Over the plug was welded a steel cap, with a hole slanting through it.

About midstream lay the G. A. McWilliams, her spuds down solid in the riverbed. On the two drums of her stern anchor winch was reeled about a mile of 1¼-inch wire cable, with a breaking strength of 69.45 tons. The cable end led out over the sheave of a derrick, and to pipe on shore. The cable was passed through the hole in the steel cap on the pipe end, and a purchase taken on the pipe. When the order to "heave round" came over two-way radio from the east bank to the winch, the pipe section was pulled half-way across the river. A guide made of war-surplus airplane wheels steadied the pipe on the bank. Pontoon barges kept it off the river floor.



Side-boom tractors handled the land pipe for the Mississippi River gas-pipeline crossing. Midwestern Constructors Co., Inc., Tulsa, Okla., was the contractor.

After the first pull, a 1,000-foot section of pipe, all ready on the bank, was welded onto the first section, and the second pull was made. A third pull was made with a 500-foot section, completing the 3,000 feet of pipe. Barges anchored upstream played out wire rope to the pontoon barges, holding them against the current.

A Pipe Broke

On November 18, the motion of a barge pitching in the current broke off the sealed end of the first of the three pipes, already pulled in a long loop two-thirds of the way across the river from the east bank. Midwestern moved the broken pipe, 3,000 feet long, a few feet up river, and put a second pipeline across. This one went across without mishap.

After the break was discovered in the first pipe, and the second line was put into service, the broken pipe end had to be retrieved, and the full length flushed with water to get the sand out.

(Concluded on next page)

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ACROW Shores in use on new 12-story River House. 1,000 shores were used on this job by Industrial Engineering Co., New York contractors.

Since it broke near its leading end, where it looped up out of the water, it didn't take long to get it ready again.

Handling Land Pipe

On the Missouri bank, the three 20-inch electric-weld pipelines climb a 45-degree hill up from the river, where they feed through header valves into the 30-inch land pipe, leveling off toward the southwest.

Handling of the heavy pipe on land, where it weighs 200 pounds per linear foot, was done by side-boom tractors using wire-rope slings or belt slings. Every now and then the pipe ashore had to be hoisted into the air high enough to let a freight train of the Illinois Central Railroad pass underneath. In such cases the side-boom tractors lifted the pipe as high as their booms would allow, and a Lorain dragline, with its bucket unshackled from the 5/8-inch wire rope it used, hoisted a high loop in the pipe, which was quite flexible in long sections, and the train went under the loop.



Sections of 20-inch pipe, their anti-corrosive coating protected by wood-lath covers, wait for the underwater pipelaying across the Mississippi.

The Pipe

The pipe, made by A. O. Smith Corp., came in 40-foot lengths. The lengths

were put through a machine that cleaned and primed the surface, then gave it an anticorrosion covering of Fiberglas, felt, and Koppers' Bitumastic enamel, heated to 475 degrees F.

The 20-inch underwater line is laminated, and consists of one 20-inch-outside-diameter pipe with a 1/2-inch wall, with two sheets of 3/16-inch plate rolled around the outside and welded. This gives a total wall thickness of 1 1/4 inches, providing negative buoyancy of about 38 pounds per linear foot, which Texas-Illinois requires for river crossings. Laminated construction eliminates the necessity for river clamps, and also provides extra protection against corrosion. Wood mats were wired around the pipe, over the enamel covering, for protection in handling.

Rather than pull the pipe into the river 40 feet at a time, then wait the four hours it takes to make a 31-bead weld, Midwestern crews put the pipe together in long sections on the bank. Welds were X-rayed, tested with 100-psi air pressure, and given a soapsuds



Superintendent M. T. Willhite talks on the two-way radio in his field office to men on the dredge G. A. McWilliams.

test, all on the job site.

Job Conditions

A total of 270 men formed the crews for the Mississippi crossing. The work had to be carried on in temperatures that varied from 104 degrees in summer to near zero in December, when the weight of ice pushing against the barges, straining the cables, was constantly a force to be reckoned with.

The river, cantankerous at best, showed its worst temper for the pipeline men. It varied 29 feet during the project, spilling over the top of the levee in September, which, according to C. S. White, was the worst September in history. "September ordinarily is a month when the river is at its lowest," he said. "But in September, 1951, it was at its highest—22 feet higher than its normal stage."

The Jones & Laughlin wire rope used on the project was equal to the tussle, however. The quantities are interesting: Midwestern Constructors used 47,000 feet; McWilliams Dredging Co. used over 25,000 feet; and Vollmar Co. used 7,000 feet, on the river crossing alone.

Personnel

C. S. White was in charge of the McWilliams dredging equipment. M. T. Willhite was Superintendent for Midwestern. Coordinator of the crossing was Howard S. Lipp of Tulsa, one of Midwestern's vice presidents, formerly an employee of Texas-Illinois' parent company in Chicago.

One-Man Chain Saw

A new gasoline-driven chain saw for one-man operation has been introduced by Reed-Prentice Corp., 677 Cambridge St., Worcester 4, Mass. Fingertip controls and full 360-degree swivel are said to provide easy handling in all cutting positions. The swivel mechanism can be set at any angle for notching and felling cuts.

The Timberhog Bantam weighs 27 1/4 pounds and has aluminum and magnesium parts. It features an automatic chain oiler, an 18-inch guide bar for pulpwood cutting, and a planer-type chain. The rewind starter and flywheel-type magneto are designed to provide quick starting under all conditions. An automatic clutch brings the sawing chain to a halt when the engine is idling.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 461.



The Timberhog Bantam one-man chain saw is driven by a gasoline engine and weighs 27 1/4 pounds.

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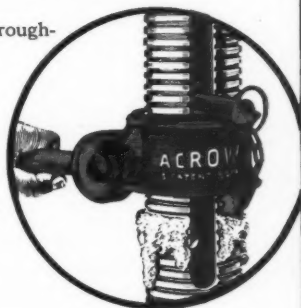
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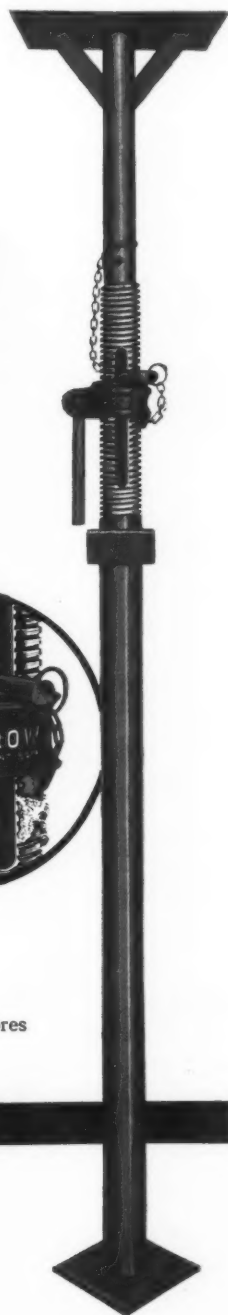
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New Stone Spreader Is Tractor-Mounted

A tractor-mounted stone spreader is announced by Tractor Spreader Co., Hasbrouck Heights, N. J. The Jersey spreader handles up to 20 tons per minute; features strikeoff adjustment for varying depths of spread from 1 to 12 inches; and has adjustable bleeder gates to allow a spread width from 10 to 13 feet in 3-inch increments.

The Model 100 is for use with the heavier crawler-type tractors and is mounted on the push beams of the dozer after the blade has been removed. Without special attachments, it can be used with either cable-controlled or hydraulic dozers by pulling the pins and mounting in position



This Model 100 Jersey spreader is mounted on a Caterpillar D8, but can be used with other heavy crawler tractors. It handles stone from 3/4 inch up.

on the push beams. To feed stone from any type of dump truck directly into the hopper, the truck is backed up to the hopper and the body raised; the forward movement is controlled by the tractor operator as the truck, steered by the driver, is pushed along.

The Model 100 handles stone from 3/4 inch up through the normal macadam range and certain subgrade materials. Over-all width is 12 feet, over-all height 48 inches, and weight (without tractor) 4,200 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 433.

177th Year for Army Corps

In 1775 the Continental Congress created the post of Chief of Engineers, with two assistants. Now, 177 years later, the Corps of Engineers is the third-largest branch of the Army, with personnel in World War II totaling close to three-quarters of a million. It marked its anniversary this past June 16.

Besides its military feats, the Corps has a long tradition of civil-works achievements dealing mainly with harbors, inland waterways, flood control, and water conservation. These activities were expanded by Congress following the last world war. Since the outbreak of the Korean War, there have been additional military tasks for the group—not, however, to the exclusion of civil works which continue at a high rate due to their long-range economic importance.

Lt. Gen. Lewis A. Pick, builder of the Ledo Road and co-author of the Pick-Sloan Plan for the development of the Missouri River Basin, has served as Chief of Engineers since March 1, 1949.

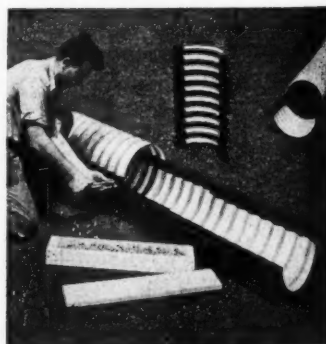
Metal Drainage Pipe

Nestable corrugated-metal drainage pipe is made by Penn Metal Corp. of Penna., Philadelphia 48, Pa. It consists of flanged half-round 2-foot-long sections which can be bolted together in the field with a construction wrench.

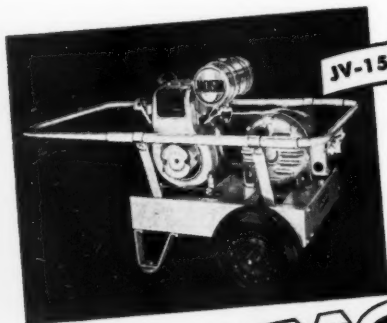
Penco pipe is available in sizes up to 7 feet in diameter. It is fabricated from Beth-Cu-Loy copper-bearing steel sheets which are said to be more resistant to atmospheric corrosion than ordinary open-hearth steel. For maximum durability, sheets are galvanized with 2 ounces of prime Western zinc per square foot of double exposed surface. Flanged and punched surfaces are asphalt-dipped for further protection.

Penco pipe may be used for all drainage purposes, above or below ground, and it is designed to carry the heaviest traffic loads imposed on any present-day roads, airports, etc. The sections are shipped in strapped bundles that cut the shipping-space requirements of assembled full-round pipe by 90 per cent, the company claims.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 479.

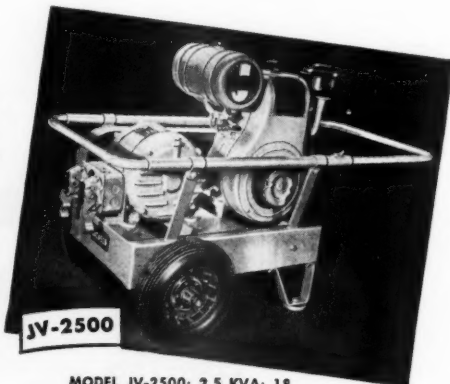


Flanged half-round sections of Penco drainage pipe are bolted together with a construction wrench. The nestable sections cut shipping space requirements by 90 per cent.



JV-1500

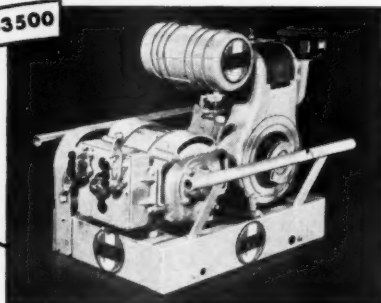
MODEL JV-1500: 1.5 KVA; 10 amps, single-phase, 7 1/2 amps per phase in 3-phase current; 5.4 HP engine; welded steel rectangular base with wrap-around telescoping handle. Weight: 280 lbs.



JV-2500

MODEL JV-2500: 2.5 KVA; 18 amps, single-phase, 12.5 amps per phase in 3-phase current; 7.3 HP engine; welded steel rectangular base with wrap-around telescoping handle. Weight: 350 lbs.

JV-3500



MODEL JV-3500: 3.5 KVA; 22 amps, single-phase, 17.5 amps per phase in 3-phase current; 7.3 HP engine; welded steel rectangular skid base with tubular handles. Weight: 360 lbs. Also available wheel or trailer mounted.



JV-5000
JV-7500

MODEL JV-5000: 5.0 KVA; 36 amps, single-phase, 25 amps per phase in 3-phase current; 20 HP; Skid mounted; 750 lbs.; With separate trailer unit; 1050 lbs.

MODEL JV-7500: 7.5 KVA; 40/20 amps single-phase, 36/18 amps per phase in 3-phase; crank or electric starter; 23 HP; weight skid mounted; 1050 lbs.; with trailer; 1350 lbs.

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Public Relations Can Help Cure Road Ills

Highway-Department PR Program Must Be Put on a Continuing Long-Range Basis; Job Primarily One for a Newsmen

By HAROLD COHEN, Chief,
Bureau of Public Relations,
Ohio Department of Highways

STATE highway departments across the nation are suffering today from a lack of funds with which to battle tremendously increased traffic—a lack caused by antiquated fiscal policies and by legislative strangle holds. Administrators with vision have recognized the symptoms but have seemed unable to alert the public, though it is the public's representatives in the legislatures of the nation who hold the key to the solution.

Highway conference after conference has stressed the need for more education, for a public-relations program that will tell the story to the public. But little has been done to set up such programs, primarily because they are foreign to engineers in general and, as such, greatly misunderstood.

Function in Government

Industry and business have made effective use of public relations to reach and communicate with the people who eventually become their clients and customers. Though state governments and their varied departments do not have to fight for attention from the public, they must win support from the public for their policies and activities.

The sound and continuing use of a public-relations program can provide the background for constructive and progressive governmental activities. While an administrator is fending off political or pressure-group attacks, his public-relations section can keep pouring out educational material about the program he is attempting to put into action. The very lobbies he fights are probably hiring the best public-relations counsel money can buy; so why should the taxpayers whom the government serves be deprived of similar counsel?

Highway public relations must be a continuing operation. Many highway departments have made excellent starts, only to have their public-relations sections usurped for political expediency as the need to win elections became more important than the need to sell the public on an adequate system of highways. This is quite understandable, but is still a serious diversion of the talent so necessary for the continuance of a sound public-relations program.

A Newspaperman's Job

A highway-department PR man should be a newspaperman. Newspapers who cover governmental agencies, especially at the state level, will tell you they need the assistance of an on-the-spot technically qualified newsmen to cover the department for them. Today's wire services and newspapers do not have the trained staff or the time to round up the facts on technical stories arising out of such departments as highways. And while it may be quite a while before the PR man acquires enough technical background to interpret engineering procedures correctly to the layman, it would take most engineers even longer to learn to write for a newspaper.

Ohio PR Section

It might be of interest at this time to outline the activities of the Ohio Department's PR section, staffed only by

a chief, his assistant, a librarian, a handyman, and a secretary. During the past year, our clipping services delivered an average of 10,000 column inches of news stories a week. This represents only a percentage of the real use of the material. It would be a safe estimate to say that Ohio newspapers devoted nearly 1,000,000 column inches of space to highway discussions. This, of course, does not include out-of-state papers, radio, television, and magazines.

A start was made three years ago from an operation which consisted only

of giving out the names of low bidders on jobs, progress reports on projects, and stories of a defensive nature designed to protect the Department from political charges.

For a year, the job centered around developing a file of information on

every phase of highway construction and administration, fiscal policies, and legal background. During this time, efforts were made to win the confidence of engineers within the Department so they would use the public-relations

(Continued on next page)



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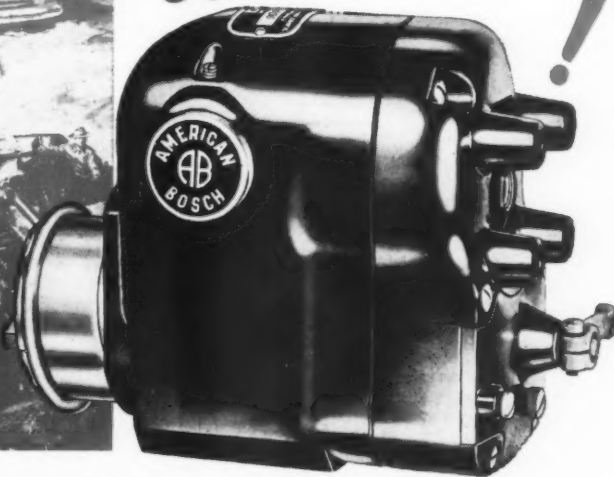
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Public Relations Can Help Cure Road Ills

(Continued from preceding page)

section without fear that their statements would be distorted for political reasons. All the while, relations with newsmen and other news sources were being developed and encouraged.

The public-relations bureau then went into full-scale action, preparing constructive stories illustrated with photos on the functions of each bureau and section in the whole Department. These stories, with accompanying mats of illustrations, were mailed regularly to all of some 400 weekly newspapers and 100 daily papers. Clippings proved that the papers wanted this material and were using it. Such story preparation can be stepped up or slowed down as desired, and is obviously dependent upon budgetary allowances, but it constitutes the basic function of any public-relations operation.

The bureau today has a vast amount of material collected and filed for ready use and reference. We are able to supply all manner of publications with feature stories or spot news. We have used television and radio extensively, too, for there is ample free time available on both if the material is presented interestingly enough.

These are technical operations with which any good newspaperman is quite familiar. The principles involved here are two: (1) that the public-relations section should be given enough time to ground itself in highway matters; and (2) that a continuation of the office be assured by effective civil-service status, as well as by adequate pay.

A Long-Range Operation

Public relations is no aspirin to be taken for immediate relief from a temporary highway headache. It must be established as a long-range operation just as the engineering functions of a highway department are organized to withstand changes in political complexions at the Governor's office. Heads of PR sections might conceivably be changed to conform with such political shifts, but the mechanics of operation can and should remain the same, year in and out.

Such a policy would allay what is probably the highway administrator's greatest fear over the establishment of a public-relations bureau: the fear that it might become a political football reacting to the disadvantage of the administration.

And if public relations is to be regarded as a long-range operation, highway administrators must organize their public-relations bureaus in such a way as to provide salaries to attract capable, respected, and experienced newspapermen.

Cooperation Needed

It must be understood that professional engineers by and large do not understand public relations any better

than newsmen understand the stresses and strains on a bridge or stretch of pavement. It takes patience, and sincerity of purpose, and cooperation on the part of the public-relations man and the highway administrator to insure a successful PR program. Even the modest success enjoyed by the Ohio bureau would not have been possible without Governor Frank Lausche's philosophy that the "best politics is good public service"; or without the understanding patience of Highway Director T. J. Kauer, who gave the bureau equal status with engineering bureaus in the matter of participating in all conferences, discussions of policy, and decisions.

Public relations is a profession recognized and used to advantage by industry and by every association in the nation. It is as important to government as it is to business that good will be built up for the time when it is needed. And government has the additional obligation, which public relations

(Concluded on next page)

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helps it to fulfill, of keeping the public informed of its activities.

Finding the cure for today's highway headache will take the best engineering thinking available. But for that thinking to become effective, it must be channeled out to create an informed public, whose wishes can soon be reflected in state legislatures. This is where a public-relations program does the job.

Soil-Mechanics Survey

A comprehensive survey of soil mechanics, with particular reference to the part this science plays in road engineering, has been compiled by the Department of Scientific & Industrial Research, London, England. The information in "Soil Mechanics for Road Engineers" is drawn mainly from the results of laboratory research and field trials carried out by the Department's Road Research Laboratory in Britain during the past 15 years, but recent developments of soil engineering in the U. S. A. and other countries are also included.

The book is divided into 28 chapters and contains 228 line illustrations, 90 half-tone plates, and a subject index. Designed primarily as a reference book and guide to current practice for the road and airfield engineer, it is of general interest to all engineers concerned with soil and should form a useful textbook for universities and technical colleges. Some mathematical treatment of the underlying theory of soil mechanics is included, but the book is essentially practical.

"Soil Mechanics for Road Engineers" is published by H. M. Stationery Office for the Department of Scientific & Industrial Research, Charles House, 5-11 Regent St., London, S. W. 1., England. The price is \$6.75.

New Lubrication Guide

For Construction Equipment

A "Lubrication and Maintenance Guide for Contractors and Allied Equipment" has been released by Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa. The 96-page booklet describes the operation of many moving parts in heavy-duty construction equipment and recommends their proper care and lubrication.

Among the major engine headings are crankcase, bearing, gear, valve, and ignition lubrication. Special equipment such as air tools, wire rope, excavators, conveyors, and crushers are also treated. Other general topics covered are storage, tires, battery, dust control, and forms. Gulf oils and their recommended applications are also listed.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 411.

Davey Promotes Mitchell

E. L. Mitchell has taken over the post of Southwestern District Manager for the Davey Compressor Co., Kent, Ohio, manufacturer of portable air compressors and lighting units, power take-offs, and allied equipment. Mr. Mitchell takes charge of company operations in Texas, Louisiana, Arkansas, and Oklahoma.

P&H Opens New Diesel Plant

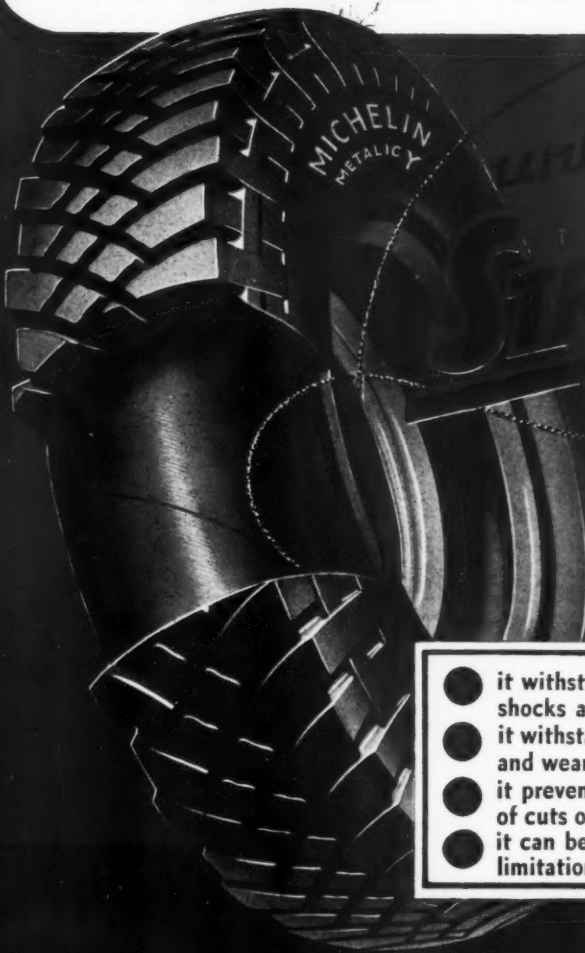
At a formal cornerstone-laying ceremony last June, Harnischfeger Corp., Milwaukee, Wis., opened a new diesel-engine division in Crystal Lake, Ill. Walter Harnischfeger, President, delivered the keynote address in which he reviewed the 68-year history of the company and the development of its products. Following the dedication, some 6,000 guests toured the new one-story building in which were set up numerous exhibits of P&H diesel engines. Guides and machine operators were on hand to explain the steps in the manufacture of diesels. An open house for employees and friends rounded off the day.

The new building—Harnischfeger's ninth plant—occupies 100,000 square feet and houses the plant and general offices of the division. With these facilities, Harnischfeger expects to triple production of its advanced line of 2-cycle diesel engines built in 1 to 6-cylinder models up to 138 hp.



Operating at an average altitude of 10,000 feet, Northwestern Engineering Co., Denver, Colo., regrades, straightens, and widens 6.8 miles of U. S. 550 in the Molas Lake Pass region, near Silverton. An International TD-24 crawler and a Bucyrus-Erie 38-B shovel work hard to meet the early-1952 completion date.

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A Contractor Views Soil-Stabilization Work

A \$250,000 Investment in Equipment Prepares Road Builder To Help Counties Offset Aggregate Shortages

By F. R. EVERDS,
Everds Contracting Co., Algona, Iowa

• **NORTHERN IOWA**, one of the richest agricultural areas in the world, is rapidly approaching bankruptcy in one sense. Its supply of gravel and rock for farm-to-market roads is diminishing at a phenomenal rate. Twenty-five years ago this glaciated region seemed to abound with gravel pits of excellent quality. Today, many counties have no gravel pits left. If the rate of depletion of surfacing materials continues, the 50-year-old man may have lived to see the cycle of mud-to-mud completed on secondary roads. Awareness of the problem has brought our State up short and has made us do something about tying down road surfaces which we have hitherto bladed away and allowed to dissipate through frost boils and faulty maintenance.

For high-traffic farm-to-market road surfaces (roads where the count runs up to 250 vehicles a day) costs run about \$2,800 for a new 4-inch cover of gravel over a 24-foot roadway, once the road has been brought up to grade. But a gravel road with this much traffic continues to be rough, dusty, and somewhat dangerous as the loose gravel is constantly whipped back and forth across the road. Then, too, each year we must add as much as 250 yards of gravel per mile for maintenance purposes. This is expensive use of man-hours and equipment; moreover, our part of the country just can't afford to use up the diminishing supply of gravel this fast.

The Best Secondary Road

Alert county engineers, working with the very capable engineering department of the Iowa State Highway Commission, believe they have the answer to conserving both materials and maintenance money on relatively high-traffic farm-to-market roads. (See C&EMonthly, May, 1952, pg. 52.) That answer is a stabilized surface mix consisting of varying percentages of gravel, clay, and calcium chloride according to highway-commission specifications.

In 1951, we laid a 24-foot-wide 4-inch-thick stabilized mixture on an 8-mile stretch of road at a bid of \$5,500 a mile. This was the average cost for 3,000 tons of stabilized mixture per mile with a 12-mile average haul. While this road cost \$2,700 more a mile than a constantly dusty, washboarded, hard-to-maintain gravel road would have cost, it has a road surface 1½ inches thicker, it is dust-free, and it requires maintenance only after rains. The county engineer involved says he sees no need of adding maintenance gravel in the predictable future. If traffic steps up and he chooses to add a bituminous-concrete paving top to this road, the engineer has his subgrade compacted, ready for higher-type surfacing.

The winter of 1950-51 was a bad one for Iowa and the spring thaws caused even well drained gravel roads to go to pieces in many instances. Almost all gravel roads were embargoed against trucks. Even passenger cars got stuck on the sidehill frost boils. As a result, maintenance gravel was added even more profusely than usual. Significantly, the gravel, clay, calcium-chloride roads laid by northern Iowa contractors stood up practically 100

per cent while the nonstabilized gravel roads were going to pieces.

Soil-stabilized roads, as we think of them in northern Iowa, are either a mixture of pit-run crushed gravel, clay, and calcium chloride—or stone, gravel, clay, and calcium chloride. The gravel is used most often. County engineers and highway-commission personnel determine the amount of clay in the gravel and then adjust the percentage of glacial clay to be added. In round figures they generally come up with

(Continued on next page)



Calcium Chloride Institute Photo

Clay for gravel-road stabilization in Iowa is delivered by Barber-Greene loader to the truck that will haul it to the processing plant.

Here's the time-proved torque converter for heavy service

—a compact, efficient torque converter and fluid coupling available for heavy-duty engine and equipment manufacturers

ALLISON—builder of more than 10,000 Torqmatic Transmissions for military vehicles—offers American industry this proved torque converter. It enables heavy-duty equipment to get more work done faster—with less wear and tear on equipment and less operator fatigue.

A combination torque converter and fluid coupling, the new Allison TORQMATIC CONVERTER gives heavy off-highway trucks and other power machinery the smoothness and operating ease you enjoy with a hydraulic transmission in your car. It makes practical multiple engine installations in heavy vehicles.

The TORQMATIC CONVERTER multiplies torque automatically, providing an efficient balance between engine power and changing load demands. This eliminates engine lugging and stalling—permits the engine to operate in its most effective speed range.

It also prevents shock-loading of drive-lines, cables, shafts, chains, gears and axles—reduces maintenance—lengthens equipment life.

Wide Flexibility

Allison TORQMATIC CONVERTERS have been applied successfully with many engines in a variety of heavy-duty equipment—trucks, tractors, earth movers,

industrial locomotives, rail cars, hoisting machinery, logging equipment, drilling rigs and pumps.

In each of these applications, the TORQMATIC CONVERTER has proved its ability to get the most work done in the shortest possible time.

Allison TORQMATIC CONVERTERS furnish ideal drives for heavy-duty engines delivering 75 to 350 horsepower. These compact units take no more space than a conventional, clutch-type, power take-off. For further information write to:

ALLISON DIVISION OF GENERAL MOTORS
Box 894C, Indianapolis 6, Indiana



SCRAPERS



TRACTORS



TRUCKS*



CRANES



SHOVELS

about 75 per cent gravel and 25 per cent clay, with 10 pounds of calcium chloride added to a ton of mix. Later—generally twice a year—more calcium chloride is spread on the road surface.

My observation on identical jobs where 15 and 25 per cent of clay was added, was that the 15 per cent clay gave a harder, firmer, quicker-setting road, I feel we frequently add a little too much clay.

Equipment Required

Getting into the stabilized-surfacing business requires a substantial investment. In my opinion, the expense involved precludes the average county or municipality from this sort of work. An adequate equipment inventory includes one \$15,000 tractor and dozer; \$10,000 for disks, harrows, and clay-processing attachments, gas tanks, welders, scale, etc.; one \$14,000 self-propelled loader; one \$15,000 dragline to rehandle clay stockpile; one \$22,000 dragline in the gravel pit; one \$45,000



Calcium Chloride Institute Photo

The processing-plant setup: At far right, the gravel hopper and the loading crane; then a Pioneer conveyor to a Cedarapids crusher; then a conveyor to a "hold" hopper; then the calcium-chloride hopper with a delivery truck in front; then the conveyor carrying processed material and CaCl₂ to a Barber-Greene pugmill; finally a Unit crane loading clay from the stockpile to a pugmill conveyor.

crusher; one \$10,000 tractor for plant power; three \$6,000 (each) conveyors; one \$30,000 pugmill; one \$3,000 wheel tractor; thirty \$3,000 (each) trucks (more or less) depending on length of haul; one \$12,000 motor grader; one \$8,000 rubber-tire roller.

That's over a quarter of a million dollars worth of specialized equipment per outfit.

Job Method

Last year we did a soil-stabilized road job in Kossuth County, which is a good example of the methods we use in this type of work. The contract was for 29 miles of stabilized-soil surfacing on a farm-to-market road. It called for 3,000 tons of mix to be placed to a 4-inch depth on each mile of 24-foot-wide road.

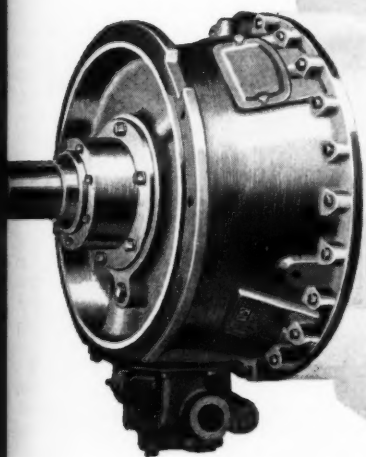
We bid the job at \$5,500 per mile. That was 65 cents per ton for processing the clay and gravel and rolling and blading at the plant, 70 cents for producing the clay and gravel, and 5½ cents per ton per mile for haul. The material was taken from county pits and the county also supplied the calcium chloride. All trucks were run over a scale for weighing before going out to the road. Since gravel was 75 per cent of the mix we set the processing plant up at the gravel pit.

A Caterpillar D7 tractor-dozzer pulling an old-type Austin-Western ripper with 11 teeth farmed the clay area over about an acre to an acre and a half. An International wheel tractor with a harrow and disk at the rear opened the clay to a depth of 4 inches. The D7 came back and dozed the clay into a windrow where it was picked up by a self-propelled Barber-Greene loader. The B-G had a ¾-inch vibrating screen at the end of its discharge conveyor. The minus-¾-inch clay fed into the trailing trucks which carried it to the stockpiles at the plant.

The plant was set up with simple material flow lines. A Sargent 34-S excavator mounting a 1-yard Page dragline pulled gravel out of the pit and fed it to a hopper at the tail end (or beginning, if you like) of the plant setup. A Pioneer 30-inch-wide power-driven conveyor carried the pit-run gravel 60 feet to the feed hopper of the crusher. We used a long conveyor so it could be swung around along the face of the pit for easy supply to the plant. The crusher was a Cedarapids Super-Tandem powered through a Caterpillar D7 power takeoff. Mounted on a Diamond T 6x6, the crusher is completely portable.

Crushed to a ¾-inch maximum size, the gravel next fed into a large "hold" hopper for proportioned delivery to a 30-inch Barber-Greene conveyor. The conveyor belt ran under the calcium-chloride hopper, straddling

(Continued on next page)



Here's how Allison Torqmatic Drive pays off:

More work output—eliminates "gearshift guess," multiplies torque hydraulically. Automatically balances engine power with changes in load demand.

Handles heavy loads—with shock-free, pinpoint control.

Few moving parts—simplified design with one-piece cast converter elements—easy to maintain.

Compact design—simplifies installation.

Longer equipment life—increases life of drivelines, axles, chains, sprockets and gears. Reduced wear and tear on equipment means higher availability.

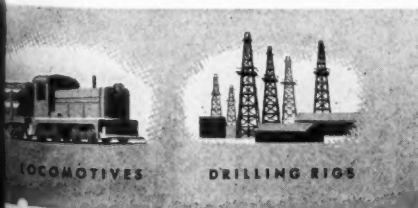
Longer engine life—no engine lugging or stalling—reduces shock-loading on engine and components.

• Designed for power application from 75 to 350 h.p.

• Wide variety of models including industrial shafts, automotive type flanges, disconnect clutches, lock-up clutches, output shaft governor drive.



Allison
TORQMATIC DRIVES



LOCOMOTIVES

DRILLING RIGS

A Contractor Views Soil-Stabilization Work

(Continued from preceding page)

it, and up to the pugmill. A workman split open the hundred-pound bags of chloride and fed them into the hopper. An adjustable opening at the

bottom of the hopper controlled the delivery onto the belt at 10 pounds of calcium chloride for each $\frac{3}{4}$ ton of gravel (that would be 10 pounds per ton of final mix).

The clay meanwhile was fed from stockpiles onto another conveyor, a 24-inch Barber-Greene, by a Model 514 Unit crane carrying a $\frac{1}{2}$ -yard

clamshell. The conveyor carried the clay up to the pugmill hopper where it joined the gravel and calcium-chloride mix. The Barber-Greene pugmill was powered by an International PD 100 engine and mounted a $1\frac{1}{2}$ -inch Jaeger pump which metered the desired quantity of water into the mix. The operation was continuous and the final mixture poured in a steady stream into 5-ton hydraulic dumps for hauling to the road. Each dump, incidentally, was weighed on a 25-ton Thurman platform scale before going to the road site.

The old road had 1,200 to 1,500 yards of gravel on each mile. We scarified and bladed this prior to placing the new surface. The trucks spaced the load out on the road for blading by a No. 12 Caterpillar grader. A 10-ton Bros rubber-tire compactor, pulled by a Minneapolis-Moline wheel tractor, finished the surface to proper density. With good weather we were able to produce about 2,500 tons of gravel and

(Concluded on next page)



Calcium Chloride Institute Photo

Calcium chloride is fed from 100-pound bags into a hopper and delivered into the belt underneath at the rate of 10 pounds to each $\frac{3}{4}$ ton of gravel.



Scottie "Construction Expert" McBlock approves a combination of superior features.



McKISSICK Steel Shell Manila Rope SNATCH BLOCK

With pressed rounded edges, prevents chaffing of your line.

- ★ Handy Drop Link design permits easy insertion of rope.
- ★ Cast iron sheaves, self lubricating bronze bushings
- ★ Drop forged hooks, heads and links.
- ★ Safe working loads up to 10 tons.

McKissick Builds a Better Block for Every Purpose.

McKISSICK

McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma



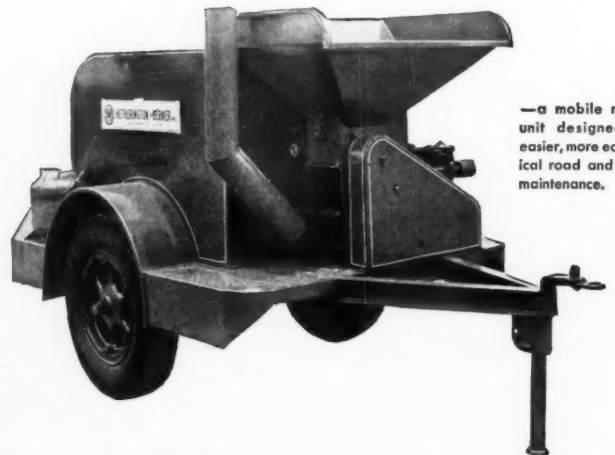
THE COMPLETE MACHINE
FOR MAXIMUM PAYLOADS

1. Continuous "L" shaped blade construction — for quicker charging — mixing — discharging.
2. Quiet, smooth roller chain — cut sprocket drive absorbs all shock.
3. Hardened nickel alloy steel drum rollers — Twin Timken mounted.
4. Clutch and Throttle Controls at either end of drum — Reached from catwalk.
5. Extra high discharge with hinged one-man chute.



CONSTRUCTION MACHINERY COMPANIES
WATERLOO, IOWA

The Moto-Patcher



—a mobile mixing unit designed for easier, more economical road and street maintenance.

for speedy, low-cost patching

● The Moto-Patcher delivers up to 10 tons per hour of *freshly* mixed material. The aggregate may either be shoveled into the hopper, or fed into the hopper by a small elevator (optional equipment). The mixed material is deposited on a pan of convenient height for easy shoveling, or it can be dropped directly onto the road surface. The 400 gal. tank assures an adequate supply of bitumen for uninterrupted production, making frequent stops unnecessary. The mixer, running through the bitumen tank, provides a drying action for the aggregate. If desirable, bitumen may be circulated when machine is not mixing.

Bulletin MP-51, giving specifications, flow diagram and complete information, will be sent on request.



HETHERINGTON & BERNER INC.
Engineers—Manufacturers
731 KENTUCKY AVENUE • INDIANAPOLIS 7, INDIANA





Calcium Chloride Institute Photo

The final gravel, clay, and calcium-chloride mix is delivered from the Barber-Greene pugmill to the truck that will haul it to the road.

1,000 tons of clay in a 12-hour day.

Our biggest soil-stabilization problem in Iowa consists of producing glacial clay that will run through a $\frac{3}{4}$ -inch screen in wet weather. Last year we had a lot of rain all summer long. We had to process three loads of clay to get one load of usable clay. That meant handling two loads of rejects for one load of pay dirt.

The engineers who determine where we get our clay can help us by making a large surface area available. Given adequate surface area to work, we can keep our clay stockpile ahead of the gravel-pit operation in average dry weather.

Conclusion

Once this type of material is spread out and compacted, the only maintenance required is a light blading immediately after a rain. County engineers in our area report that a new piece of equipment which we have developed, the Multi-Blader, tends to float over the roads without cutting into the hard wearing surface. It sorts the large, loose particles to the top and the fines to the bottom, and eliminates dangerous windrows. The Multi-Blader attaches to any standard heavy-duty motor grader and is said to be practically foolproof in the hands of even an inexperienced operator.

Summing it up. . . . To conserve rapidly diminishing supplies of surfacing material in our part of the country, we stabilize. When we stabilize, we start saving at once through sharply decreased maintenance costs. We save materials, equipment, and man-hours, and we produce roads that are safer, cleaner, and smoother.

A New Nailing Tool

A semiautomatic nailer that attaches to any pneumatic hammer with a No. 2 Morse taper is announced by Fox Nailer Corp., 3706 Airport Way, Seattle 4, Wash. It is 6 inches long and weighs one pound. It has four parts, two of



The Fox No. 16 semiautomatic nailer may be attached to any pneumatic hammer. It is 6 inches long and weighs one pound.

them moving parts that require no lubrication.

The nailer drives 6 to 16-penny common nails. The nail is fed head-first into the muzzle of the nailer and driven by rapid blows of an alloy-steel plunger when the trigger is pulled. The company points out that the nailer reduces operator fatigue and time on overhead nailing, and that it can be disassembled in seconds when service is required.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 454.

Turner Operating Yards Move

Turner Construction Co. has moved its operating yards from Maspeth, Long Island, to a 2-acre tract in the Bergen County Industrial Terminal, South Hackensack, N. J. A garage, maintenance shop, and open storage areas utilize the entire site, which not only has rail siding but is also strategically located for trucking. Headquarters are at 420 Lexington Ave., New York, N. Y.

HERE'S A FASTER, EASIER, CHEAPER WAY
TO HANDLE MORE DIRT, ROCK OR GRAVEL!

OMAHA
STANDARD
BODIES



The OMAHA STANDARD "CENTER DUMP" Trailer . . .

. . . Custom Built to Job Requirements is designed for contractors who want to haul dirt, gravel, rock, long or short distances, quickly and at low cost, for stock piling, spreading or dumping. Contractors say it is just what they have been looking for!

- ★ Each unit built to job requirements.
- ★ Available in sizes and lengths to meet all bridge, axle laws.
- ★ All steel welded body, chassis. Built to withstand roughest loading, toughest service.
- ★ Dumping mechanism FOOL-proof — trouble-FREE!
- ★ Release on doors INSTANT, shock-proof, protected from material flow.
- ★ Meter control that can be pre-set.

Write at once for specifications and descriptive folder that will answer your questions and show how you can make every load a "profit" load. Address today—

OMAHA STANDARD

FACTORY & MAIN OFFICE

2411 West Broadway Council Bluffs, Iowa

NOW! Do your construction fastening up to 100 times faster with REMINGTON STUD DRIVER ... and do it safely!

NEW
CARTRIDGE-POWERED
MODEL 450

This revolutionary tool attaches steel or wood structural pieces to concrete or steel surfaces in seconds . . . cuts costs and working time on construction jobs. Completely self-powered, the Stud Driver sets as high as 5 studs per minute . . . with no outside power source or other equipment required. Studs have pull-out resistance as high as two tons!

Test-proved to be the world's

finest and speediest fastening system, the Model 450 Remington Stud Driver is made by Remington Arms Company, Inc., America's oldest and foremost sporting arms manufacturer. Price for Model 450, complete in rugged steel carrying case—only \$119.50. To obtain detailed information on this time and money-saving tool, and for the name of your nearest distributor, fill out and mail the coupon below.

Speeds all these jobs . . . and many more!

1. Fastening wood sleepers to concrete or steel.
2. Hanging steel sash and door bucks to concrete.
3. Anchoring stadium and theatre seats to concrete.
4. Fastening wood furring strips to concrete walls and ceilings for attachment of metal lath.
5. Anchoring wood plates to concrete slabs.
6. Hanging radiator housings to steel or concrete.

"If It's Remington—It's Right!"

Remington

DUPONT

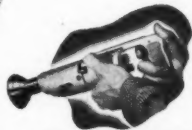
Remington Arms Company, Inc.
Industrial Sales Division, Dept. CEM-8
939 Barnum Ave., Bridgeport 2, Connecticut

I am interested in obtaining detailed information on the Model 450 Remington Stud Driver.

Name _____
Firm _____
Position _____
Address _____
City _____ State _____



Simply hand-assemble stud and power cartridge, load as a unit in easy-to-open Remington Stud Driver, and close.



Press loaded Stud Driver firmly against surface, depress safety lever and pull trigger. Explosive charge imbeds stud solidly.

Howe Scale Names Managers

The Howe Scale Co., Rutland, Vt., has appointed five new branch managers, as follows:

Chicago, Ill.—Fremont Fisher, formerly Philadelphia Branch Manager. Philadelphia, Pa.—Manuel J. Kauff-

man, formerly salesman at this branch. Denver, Colo.—John R. Berry, formerly salesman at the Houston branch. New Orleans, La.—Charles J. Koch, who succeeds Clinton C. Romig, retired. Seattle, Wash.—O. B. Phillips, formerly salesman at this branch, who succeeds the late Albert N. Lyons.

COMPLETELY
PROVEN!

4

WHEEL
DRIVE

WITH 2-SPEED RANGE FOR
CHEVROLET and GMC TRUCKS

at a new low cost!



NO OTHER 4 WHEEL DRIVE
COMPARES WITH NAPCO'S
Powr-Pak . . . absolutely the
FINEST for PERFORMANCE,
DURABILITY and COST!

The NAPCO 4 Wheel Drive is by far the lowest priced in the field. What's more, you get a better, more powerful unit that is outstanding for rugged construction and unexcelled for lasting performance. It is the same military-type 4 wheel drive chosen by the U. S. Armed Forces during World War II on the hundreds of thousands of Chevrolet and GMC trucks used throughout the world.

Installation is simple, can easily be completed in one day! All front axle differential parts are the same as the standard rear axle.

Write today for free, illustrated folder giving complete details and specifications on this completely proven NAPCO 4 WHEEL DRIVE



Contact your local Distributor or write direct
NORTHWESTERNAUTO PARTS CO.

201 NORTH SEVENTH ST. MINNEAPOLIS, MINN. U.S.A. CABLE ADDRESS: NORAUTO

ONLY
\$1485

F.O.B.
MINNEAPOLIS

OVER ROUGH TERRAIN

Extra dependable traction with NAPCO 4 WHEEL DRIVE takes your truck through almost impossible areas in less time, and with minimum maneuvering.

FOR TOUGH UPHILL GOING

No ordinary 4 wheel drive can match the NAPCO Powr-Pak on gradesability—in low-low, your truck will climb grades up to 70 per cent!

MASTERS MUD AND SAND

NAPCO 4 WHEEL DRIVE assures plenty of traction to enable your truck to go through mud and sand easily where other trucks stop dead in their tracks.

OVER ICE AND SNOW

Sure footing, greater safety and plenty of push on the slickest roads are wrapped into one unbeatable package—the NAPCO 4 WHEEL DRIVE!



A workman stud-welds corrugated-asbestos siding around a transit shed on the Port of Boston Authority's Mystic Pier No. 1 project. He is just about to pull the trigger on the Nelson stud-welding gun. It has a plastic-tube extension which is inserted through a predrilled hole.

Stud Welding Aids A Pier Contractor

The use of 1/4-20 x 1-1/2-inch stainless-steel Nelweld fasteners end-welded with a Nelson stud-welding gun solved one of the problems connected with the erection of the Port of Boston Authority's new Mystic Pier No. 1 (see C. & E. M., June, 1952, pg. 18). Atmospheric conditions dictated that a 246,000-square-foot transit shed, surrounded on three sides by sea water, be enclosed in corrugated-asbestos siding. The subcontractor for this job—Federal Sheet Metal & Roofing Co., Jamaica Plain, Mass.—installed 560 squares of Careystone siding with the aid of the Nelson stud-welding outfit. For the installation of corrugated-asbestos interior fire curtains, too, the consulting engineer, Thomas Worcester, Inc., specified Nelweld fasteners as being neater than stainless-steel clips and bolts and easier to install in tight spots.

Stud welding came to the rescue a little later as well, when more than 32,000 linear feet of sprinkler lines in the transit shed had to be placed above the bottom chord of the welded roof trusses supporting a flat concrete roof deck. There was no place to fasten the usual type of clamp, so H. G. Vogel Co., sprinkler - installation subcontractor, welded more than 4,000 studs to the flanges at the top of the trusses and extended the supports with rods to the sprinkler-line level. Merritt-Chapman

& Scott Corp., New York, N. Y., was the general contractor on the Mystic Pier project.

Folder on Saw Technique

A 4-page folder, "What Magic Pivot Means to You", is being offered to power-saw users by Cummins-Chicago Corp., 4740 N. Ravenswood Ave., Chicago 40, Ill. The principle of Magic Pivot, a technique that places the pivot point of the saw shoe as close as possible to the saw shaft and the work, is illustrated by eight simplified engineering drawings.

A chart gives the price, weight, and depth-of-cut features of Cummins Maxaws with Magic Pivot; and there is a picture and record of achievements of Fred Wappat, inventor and designer of Magic Pivot, pioneer of the portable electric saw, and developer of the telescopic saw guard.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 441.

WATSON-STILLMAN HYDRAULIC POWER TOOLS FOR INDUSTRY



HYDRAULIC JACKS

WIRE ROPE SHEARS

These sturdy units, with either independent or integral pumps, are useful for many jobs in construction and maintenance. Capacities from 20 to 500 tons.

W-S wire, cable and bar shears provide years of trouble-free general service. They are light and portable for convenient on-the-job use.

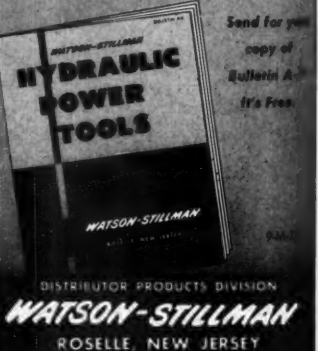


PORTABLE PIPE BENDERS

HAND PUMPS

Bends all standard, extra heavy and double extra heavy steel pipe from 3/8 in. to 2 in. inclusive, as well as standard weight pipe up to 3 in. diameter. Also handles solid mild steel bars up to 2 in. diameter.

Single and double plunger types, with reservoirs of different capacities to suit the job, these hand pumps have a wide application for operating small hydraulic tools, jacks and other hydraulic equipment, and for general hydrostatic testing purposes.



HEAVY-DUTY TRENCHER

WITH NEW IMPROVED SELF CLEANING BUCKET — Capacity 1/2 yd.

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent and is easily attached by one man in 15 minutes.

The Whitestown trencher is equipped with a 1/2-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for four years, and has proved to be rugged and satisfactory in every way.

• Immediate delivery can be made.



The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:

Allis-Chalmers HD-5G equipped with TS-5 tractor-shovel
Caterpillar D-4 and Trackson HT-4; Oliver with 4-A Lull loader
International TD-8 & TD-9 equipped with new Bucyrus-Erie dozer-shovel
International TD-8, TD-9 & TD-14-A with Hough bulldozer-shovel
Hough Model HM-Payload; Trojan Loadster, Models LM-75; LC-100-B

• Please specify make of tractor.

WHITESTOWN TRENCHER CO., INC.

Wood Road, Whitesboro, New York

Phone: Utica 6-2430



A Stewart-Warner preheater is shown in use with a Waukesha diesel engine to speed up starting in cold weather.

Preheating System Starts Cold Engines

Preheating equipment which is said to make it possible to start diesel or gasoline engines under severe cold conditions is announced by Stewart-Warner Corp., 1514 Drover St., Indianapolis 7, Ind.

The equipment works in two stages. When preheating, it circulates hot air around the battery, the internal part of the engine, and through a heat exchanger in the oil sump. After preheating, a valve is closed where the system enters the crankcase, sending the air through the induction system. The oil and battery are warmed during both stages. The company claims that most of the resistance to cranking power is eliminated in 10 to 20 minutes with this system.

Introducing heated air into the induction system aids combustion by warming the air and fuel vapor while preventing condensation of the fuel on cold manifold walls. Finned tubing routed through the oil sump carries 400-degree air to heat the oil.

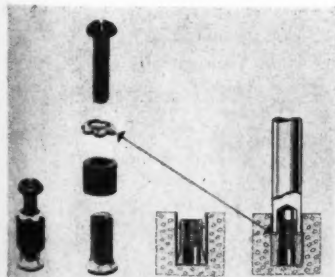
Using the Model 978 heater with a delivery of 20,000 Btu per hour, the company reports that a General Motors 6-cylinder diesel has been started with less than one minute's cranking at 60 to 90 rpm at temperatures from 25 to 65 degrees below zero. The engine was preheated from 25 to 75 minutes. Cranking power inputs ranged from 6,000 to 10,000 watts.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 423.

A New Screw Anchor

A screw anchor for use wherever machine screws, stove bolts, or wood screws must find an anchor in brick or masonry is made by Super-Grip Anchor Bolt Co., Inc., 3333 N. 22nd St., Philadelphia 40, Pa. It prevents loosening and pulling out under conditions of vibration or strain.

Main features are a threaded insert, lead sleeve, and a cup-shaped fluted steel anchor. When driven into place, the lead mushrooms out and then the steel anchor collapses, forcing sharp edges into the masonry and the threaded component.



When driven into brick or masonry, the lead of this screw anchor mushrooms out and the steel anchor collapses, forcing sharp edges into the masonry and threaded component.

A tamping tool, provided with every 100 anchors, is used to mushroom the lead sleeve and flatten the steel anchor. The company also provides a blow tube that is inserted into the masonry hole to remove dust and dirt. This assures anchorage against masonry instead of loose dirt.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 550.

Book on Technical Reports

How to communicate every kind of technical information—written or oral, formal or informal—in simple, clear, good English is the keynote of "Technical Reporting" by Joseph N. Ulman, Jr., of M. I. T. The handbook explains

important fundamental principles and suggests a general procedure for writing a report or paper.

The book covers the form or makeup of the various kinds of reports and letters and their headings. It gives instructions on style, grammar, and punctuation with a number of examples of unclear writing and suggested revisions.

A section covers the use of visual presentation in technical reporting. It includes information and illustrations on graphs, curves, drawings, diagrams, maps, etc. The appendix of the book lists abbreviations for scientific and engineering terms and includes specimen reports and letters.

This book may be obtained from Henry Holt & Co., 383 Madison Ave., New York 17, N. Y. Price is \$4.75.

Cab for Crawler Tractors

Literature on cabs for International crawler tractors is available from Allen Industrial Products, Inc., 97 Liberty St., Battle Creek, Mich. The units are made of all-steel welded sections. The interior surfaces are heavily coated with a rubber-base deadener to dampen vibration and noise. Doors can be removed to suit varying operating conditions. A 5-speed pressurizer, optional on the TD-24, draws air at 500 cfm through a filtered inlet at the top of the cab. A 20,000-Btu hot-water heater is available for all models.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 16. Circle No. 429.

THE NEW ALL-PURPOSE

Adams TravelLoader

Loads with equal speed and efficiency from both windrows and stockpiles



● Fast loading—at low cost! That's what you want and get in the great new All-Purpose Adams TravelLoader. Loading with equal ease from either windrows or stockpiles, as pictured at right, the TravelLoader offers many important operating and design features:

- High-Speed, Full-Floating Feeder . . . delivers a fast, continuous flow of material to trucks.
- Adjustable Conveyor . . . raises and lowers to accommodate trucks of all sizes—provides better load distribution in trucks with less dust.
- Centrally-Located Cab . . . situated high out of the dust area—affords operator full vision in all directions—working or traveling.
- A Wide Range of Working Speeds—from 0.23 mph.—and a high transport speed of 25 mph.

Let your local Adams dealer demonstrate how the new TravelLoader will speed work and cut costs—for you!

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, IND.



Motor Graders

TravelLoaders

Pull-Type Gra

City Wins Toughest Flood Fight in Years

Snow Pack in Hills Sends Floodwaters Surging Through Salt Lake City Streets; Men Battle to Exhaustion

By RAY DAY

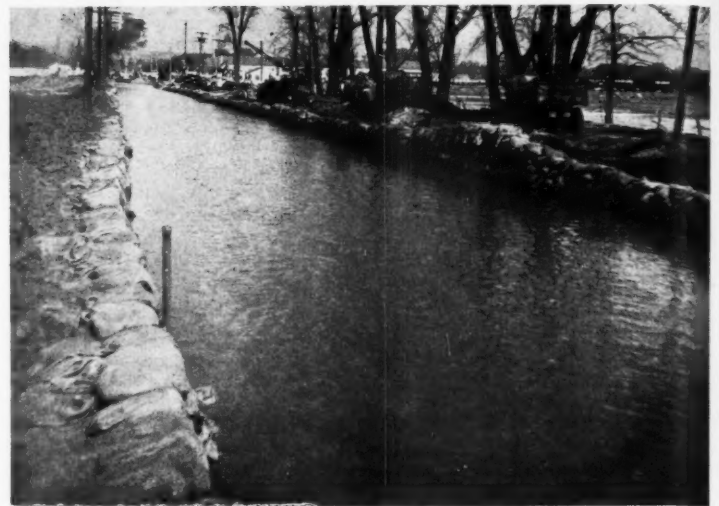
• SALT LAKE CITY has had it.

This great city at the crossroads of the west, staked out by Brigham Young on the Salt Lake Desert at the foot of a ring of somber snow-shrouded mountains, has whipped a flood almost everybody believed could never happen. Thirteenth South Street, one of the better boulevards, still has earth dikes 12 feet high along its curbs, and water races down its center. The Jordan River and the Surplus Canal are still bank-full. But Salt Lake City is breathing easier, and City Engineer

Roy W. McLeese is getting some sleep. McLeese, a wizened little half-pint of a guy with a heart for his job, got up out of a sickbed to lead the fight. With volunteers and a nucleus of engineering personnel consisting of only a few of McLeese's assistants, a flood at least twice as bad as any previously experienced was whipped to a standstill. With the help of contractors, equipment distributors, the County, and the State, about 150,000 cubic yards of earth dikes were built in two weeks. Sandbags filled ran into the million-plus mark, as near as can be estimated. There was some property damage, but many millions of dollars in potential damage were saved.

Flood Background

Of all the cities in the United States, Salt Lake City in its semi-arid location could least be expected to be hit by such a disaster. When the first Mormon emigrants arrived at the site of the city in 1849, there was enough water in nearby mountain streams for the foreseeable future, but there was no oversupply. Seasonal periods of high water have sometimes occurred, but they have not been major problems. As a matter of fact, the Bureau of Rec-



Salt Lake City Police Dept. Photo

Under this river is a major Salt Lake City street — 13th South. This is the way the stream was carried across town.

lamation at this time has several supplemental water projects under way to help Salt Lake City and Provo.

Out of the 8,000-foot-high Wasatch Mountains which circle the city east and north come the drainage channels from the major watersheds: Parley's, Emigration, and Red Butte Canyons. At 13th South Street and State Street, not far from the center of the city, they meet.

Parley's Canyon has a water-supply reservoir called Mountain Dell Lake, which can also do some good in controlling floods. Emigration and Red Butte Canyons are still undeveloped so

(Continued on next page)



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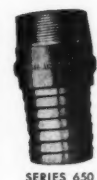
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far as flood-control works are concerned. At the meeting point of these streams the City built a storm sewer several years ago to carry about 300 cfs across town. The old Surplus Canal, built in 1883, gave still another means to divert part of the water from the Jordan, which meanders through the heart of the city.

To complicate the situation, Utah has a state law which makes counties responsible for the control of streams, even when they pass through a city.

McLeese, who was born and raised in Salt Lake, realized all these things. And when the January snow reports showed the heaviest pack with the highest water content in decades, he began to worry. He pestered the City Commission, county officials, and even state people. From January to April, his progress was nil. Salt Lake City had never had a flood before, and people simply didn't believe it could happen in 1952.

By April 6, however, the snow pack had begun to melt off rapidly during a short period of warm weather. Jordan River began to rise. McLeese repeated his warning, and this time the Commission authorized a \$50,000 emergency fund to build dikes and other protective works along the Jordan, a surplus canal.

The Utah Construction Co. moved in with four ¾-yard draglines, trucks, and a few tractors. The work was proceeding fairly well, and \$25,000 worth of dikes had been built, when the Jordan suddenly went wild. By April 18 the alarmed officials had all gaging stations manned, and an emergency meeting between city, state, county, and U. S. Army Corps of Engineers officials was called. A temporary flood commission was set up, financed to the tune of \$25,000 each by City and State, and \$50,000 by the County.

Worried and sick from a long but unsuccessful battle to prepare for the flood, McLeese contracted a case of flu. He was confined to his home on orders of his doctor when, on April 20, the flood came.

Fifteenth East Hit First

On Sunday night, April 20, a culvert pipe blocked off at 15th East Street. Before the inlet could be freed, a lake had started to back up toward the nearby residential area. Before anything could be done, the rising waters ripped through the street and by morning the whole roadway at that



A 10-inch Gorman-Rupp pump deals with the temporary "river" down 13th South St.

point was gone.

Up from his sickbed, McLeese began to direct flood-fighting operations. The

first thing, he reasoned, was to get that culvert pipe unplugged. But how? By this time it was covered with water,

mud, and silt. A City-owned dragline came in to dig for the entrance, but its boom was too short. Surveyors then located the entrance by shooting a pair of intersecting lines with transits, and McLeese soon had a longer-boom contractor's dragline at the site to open it up.

But the machine was unable to do so. The entrance grate, which had been laid on a 45-degree angle for easy removal, had since been sealed in with a concrete cover, placed by another city department. Houses were nearby, but McLeese decided to try dynamite. Guessing where the end of the culvert was, he had 2½ pounds of powder exploded on top of the pipe just back of the entrance grate. It failed to make a hole. The next shot called for double the amount of powder. It worked, and the water again started to flow through the culvert. The lake that had been

(Continued on next page)

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City Wins Toughest Flood Fight in Years

(Continued from preceding page)

built up in the meantime remained at about the same level.

But trouble began to develop all over the place. The same kind of plug-up blocked off a culvert at 13th East Street, and the water began to get out of hand. By now, officials were becoming very much concerned. McLeese and the key members of his staff had been on the job continuously for 65 hours, and the flood was just beginning to get bad.

By April 25, the storm sewer at the junction of the streams was under a hydraulic head. Manholes began to blow off, and water started running down 13th South Street. It was then that McLeese realized that every hour counted. In one night he needed 1,800 cubic yards of dike material. Utah Construction Co. put 70 trucks on the job and delivered it. The street was quickly converted to a river capable of handling about 700 cfs. Gone was the earlier plan to divert through the Surplus Canal and use the Jordan for emergency water. Now the Surplus Canal, the Jordan, and 13th Street were running full.

Quickly, with the cooperation of the Union Pacific and D. & R. G. W. Railroads, large-diameter culverts were laid to breach the two railroad tracks in the way. Sandbags were placed along the roadbeds, but the rapidly rising water began to lap over the top and eat away at the cinder roadbeds. In the nick of time the culverts were installed.

Meanwhile, appeals had gone out for volunteer help. Men responded. There was a particularly good turnout of teen-agers from local high schools. Two salt spreaders went into action. Backed end to end, with the spreader fans removed, they were used to fill sandbags. These were turned out by the hundreds of thousands, and the City's maintenance yard swarmed with traffic as people jammed the place to get sandbags placed around their property. Two pits furnished the sand, and miraculous lines of sandbagged dikes appeared in the danger areas in short order.

Then Failure!

By this time people were beginning to believe the worst was over. Several had even offered to whip McLeese personally for routing the water down 13th Street. But McLeese's troubles were just beginning.

For one thing, the dikes as built were not high enough to hold the flow. They had to be raised. Water levels crested so fast that a tough decision had to be made; a dike had to be cut to let some of the water spread out. This was turned out through a lightly settled industrial section, where the least amount of property damage was likely.

The most heartbreaking thing of all, however, was the sudden failure of one of the main dikes along 13th Street. One night about 1 a. m., when key crews were dead for sleep and most of the volunteers had gone home, this dike softened and broke. By 1:30 a. m. McLeese was at the site with contractor's equipment. They hauled material all night long, with McLeese personally acting as spotter and dump man.

Shortly after daybreak, the closure was about ready. Trucks quickly poured the dirt in. When the last truck backed in to make the closure complete, McLeese gave the signal for the driver to stop. Instead of hitting the brake pedal, the driver hit the gas. McLeese barely leaped away in time as the truck hurtled back into the breach, down over its axles, and mired in the bank. The driver wasn't hurt, but by the time they got the truck out, the breach was wider than ever.

"I just about gave it up then," McLeese said later. "That looked like the end of everything. But then I got to thinking about all that had been done before, and it didn't seem so bad."

Nevertheless, McLeese realized the fight was in real danger of being lost unless help came quickly. A 5 a. m. conference of the City Council was called. Various agencies then got together in planning, and by noon the next day they were fully pledged to cooperate. McLeese was officially placed in charge, with authority to arrange for men, materials, and equipment.

He stepped up the program immediately. As equipment came in he put it to work strengthening and raising the dikes, and building new ones. Be-

cause of the early efforts of his group, there was a real nucleus to work from, and slowly the water was brought under control. By May 20 the worst of the flood had passed, leaving minimum damage for so much water. The Jordan River and the other streams are still bank-full at this writing, but one of the most hectic 3-week periods in the history of the City Engineer's office is over.

Cleanup Job Remains

There remained, of course, a cleanup job of enormous magnitude. All the dikes which were hauled in so hastily along 13th Street had to be cleaned up and hauled out. Since much of the flood occurred near the industrial and manufacturing area, many firms offered

to clean up the material free of charge to the City, so they could use it in building up their properties. Pumps began working night and day to clean up the remnants of lakes which were formed when the dikes broke.

It was expected to be late summer before this cleanup job was finally finished.

McLeese believes the flood will result in a wave of public demand for adequate works to prevent a recurrence of this disaster. While no lives were lost, it is entirely conceivable that a repetition of the flood at some future date could result in many lives lost, as well as in property damage which would more than justify construction of storm sewers, channels,

(Concluded on next page)

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and possibly detention reservoirs in Red Butte and Emigration Canyons. One thing is sure: transportation of floodwater across town over city streets can be improved upon.

Throughout the emergency, Salt Lake's sewage system worked perfectly. McLeese ordered all manholes caulked and battened down, and an extra effluent pump installed at the treatment plant to handle excess water reaching there. A typhoid epidemic was prevented.

One thing McLeese still isn't clear on. He doesn't know what happened to his case of flu. "I guess I wore it out", is his explanation.

He has high praise for L. W. Myers, B. E. Mellenthin, Harry Butcher, and Maurice McKendrick of his staff, who

stayed with the fight day and night. Comm. Joe L. Christensen of the Salt Lake Street Department handled the many telephone calls and kept up on routine business matters. Mayor Earl J. Glade, Comm. L. C. Romney, B. E. Lingenfelter, and Grant Burbidge also worked night and day.

"It would be impossible to name all of the fine people who cooperated in this flood fight", says McLeese. "Utah Construction Co.'s Superintendent, William Spalding, gave us everything he had in the yard. Other contractors and equipment distributors did a fine job."

McLeese has not, as yet, written a report about the flood. He is too busy trying to stop the next one by urging, on anyone who will listen to him, a

flood-control system which will prevent a flood like this from ever happening again.

New Measuring Wheel

A measuring wheel 4 feet in circumference that registers distances up to 100,000 feet is offered by Rolatape, Inc., Santa Monica, Calif. It measures and records as it is wheeled over a course.

Model 400 is used for estimating, layout, inventory, invoice checking, pipeline work, electrification surveys, and general survey work. It measures around corners, over contours, and does not sway in operation.

The unit weighs 5 pounds and is operated by one man. The counter is in plain view at all times. The handle



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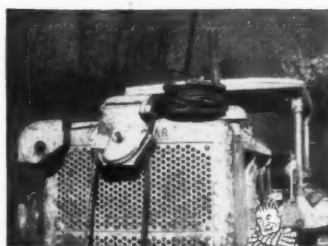
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folds compactly so that the wheel can be carried or stored in a car or truck compartment. A stand holds the wheel upright while the operator is logging data. The Model 400 can also be operated by the driver of a vehicle as it is driven slowly over the course to be measured.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 549.

Jet-Piercing Blastholes

A booklet on jet-piercing of blastholes is available from Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y. It describes and illustrates the techniques, apparatus, and various processes used to pierce blastholes in Taconite ore in the Mesabi range in Minnesota.

Jet-piercing uses thermal energy from the expansion of hot combustion gases through divergent nozzles. The method produces high-temperature supersonic jets having velocities of about 6,000 feet per second. Impinging the flame jets on rock causes a thin surface layer to expand and break away from the base. The dynamic action of the jets whisks the spalled rock out of the path of flame exposing more rock for attack.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 405.

Another Hat Trick

Dave Quackenbush, a jackhammer operator at the Jones & Laughlin Steel Corp.'s Benson Mines at Star Lake, N. Y., has provided a new angle on safety hats. While drilling a large rock, he slipped and fell, landing head first on a pile of rocks below. Mr. Quackenbush owes his life to the fact that he was wearing his Skullgard, which was held firmly in place by the chinstrap. The hat has not been the same since, but Mr. Quackenbush is doing fine. The Skullgard absorbed the impact by shattering, so that the force of the fall was dissipated and the wearer's head, neck, and spine were saved from serious injury.



Dave Quackenbush may like to keep his life-saving Skullgard as a souvenir. This is how it looked after his head-long fall onto a pile of rocks.



The Twin Bin batcher in use during a bridge pour in Marshall County, Iowa.

New Batchers Stores And Weighs Aggregate

A concrete batcher used with 1, 2, or 3-bag mixers is manufactured by Cimco Mfg. Co., Box 422, Marshalltown, Iowa. The Twin Bin consists of a stock bin and a scale bin. The stock bin receives and holds the sand and gravel, and the scale bin weighs the aggregate before releasing it into the mixer skip.

The company points out that three men can handle the entire mixing operation. One loads the stock bin, another handles the cement and the mixer, and the third operates the three discharge gates under the sand and gravel.

The stock bin stores 20 cubic feet in each compartment. It is 7 feet high, over 9 feet wide with sideboards, and weighs 610 pounds. It can be loaded by small and medium loaders or clams. The scale bin stores up to 8.5 cubic feet and weighs 180 pounds. It has a spring-assisted dump gate.

Further information may be secured

from the company. Or use the Request Card at page 16. Circle No. 407.

Masonry Water Repellent

A 3-page bulletin on Dam-Tite masonry water repellent has been issued by Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio. Dam-Tite is a transparent colorless liquid which can be brushed or sprayed on all masonry surfaces. Made with a silicone resin base, it lines pore walls with an invisible protective coating which, according to the literature, prevents the entrance of water and at the same time permits the passage of air. Dam-Tite is said to be the remedy for interior moisture damage due to damp masonry walls and for exterior damage such as chipping, flaking, staining, and efflorescence. Other information includes how, when, and where to use it.

This literature may be obtained from the company by requesting Bulletin 25219, or by using the Request Card at page 16. Circle No. 435.

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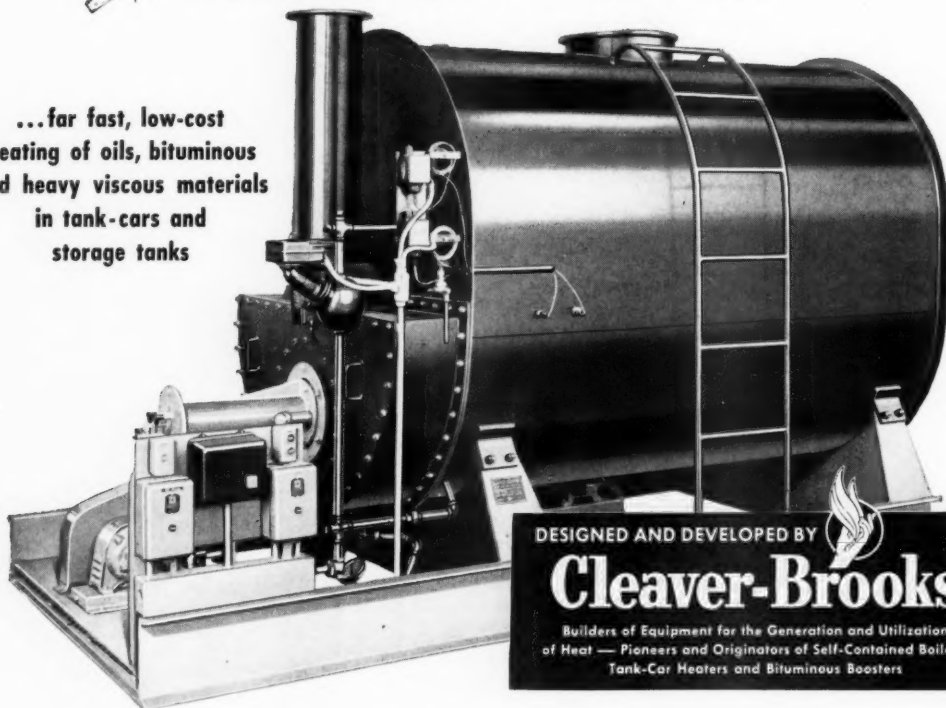


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MAINE—Parker-Danner Co., Riverside Drive, Augusta.
MASSACHUSETTS—Parker-Danner Co., 25 Factory St., Hyde Park 38; 71 Needham St., Newton Highlands.
MICHIGAN—Eddy & Co., 137 E. Main St., Detroit.
MINNESOTA—Ruffridge-Johnson Co., 230 Tenth Ave., S., Minneapolis.
MISSISSIPPI—Wickham-Aldridge Equipment Co., 916 S. State St., Jackson.
MISSOURI—The Victor L. Phillips Co., 16th and Baltimore Sts., Kansas City; The George F. Smith Co., 5215 Manchester Ave., St. Louis.
MONTANA—Hall-Perry Machinery Co., 304 Pratt Bldg., Billings; 802-812 E. Iron St., Butte; Coram; P. O. Box 307, Great Falls; Missoula.
NEBRASKA—Anderson Equipment Co., 200 Merchants Nat'l Bank Bldg., Omaha.
NEW HAMPSHIRE—Parker-Danner Co., 507 Elm St., Manchester.
NEW JERSEY—R. E. Brooks Co., Route 17, Box 17, Hasbrouck Heights.
NEW MEXICO—R. L. Harrison Co., Inc., 1801 N. Fourth St., Albuquerque.
NEW YORK—Syracuse Supply Co., 76 Wall St., Binghamton; 2080 Military Rd., Buffalo 17; R. E. Brock Co., 50 Church St., New York; Syracuse Supply Co., Portville Road, Olean; Van's Equipment Sales, Inc., Routes 9 and 20, Rensselaer; 1349 University Ave., Rochester; Syracuse Supply Co., 294 Almsley Dr., Syracuse.
NORTH CAROLINA—North Carolina Equipment Co., P. O. Box 5006, Asheville; P. O. Box 1205, Charlotte; P. O. Box 128, Guilford; P. O. Box 655, Wilmington; 3101 Hillsboro St., Raleigh.
NORTH DAKOTA—Northwestern Equipment, Inc., 711 11th St., Bismarck; 901 Eighth St., Devils Lake; P. O. Box 110, Dickinson; P. O. Box 152, Fargo; P. O. Box 335, Minot; P. O. Box 628, Wahpeton.
NEVADA—Sierra Machinery Co., 307 Morrill Ave., Reno.
OHIO—The W. W. Williams Co., 914 Main St., Cincinnati; 18301 Brookpark Rd., Cleveland 11; 855 W. Goodale Blvd., Columbus; 1260 Conant St., Maumee.
OKLAHOMA—The Victor L. Phillips Co., 1101 E. Archer, Tulsa; 1222-24 W. Main St., Oklahoma City.
OREGON—Howard-Cooper Corp., Highway 99E, P. O. Box 443, Albany; Highway 99, P. O. Box 88, Central Point; P. O. Box 1, Coquille; First and Van Buren, Eugene; 3871 S. Union St., Portland 13; 225 E. 2nd Ave., S., Roseburg.
PENNSYLVANIA—The Capital Equipment Co., 518 Paxton St., Harrisburg; Afan A. Wood, 1649 N. Broad St., 905 Hardt Bldg., Philadelphia; Dravo-Doyle Co., 2601 Poyte Ave., W. S., Pittsburgh 12.
RHODE ISLAND—Parker-Danner Co., 139 Allens Ave., Providence.
SOUTH CAROLINA—South Carolina Equipment Co., 444 Gadsden St., Columbia.
SOUTH DAKOTA—Sioux Road Equipment Co., 500 E. Sixth St., Sioux Falls; Box 541, Rapid City.
TENNESSEE—Wilson-Wessner-Wilkinson Co., 202 W. Morella Ave., Knoxville; Tri-State Equipment Co., 124 E. Calhoun Ave., Memphis; Wilson-Wessner-Wilkinson Co., 310 S. 2nd St., Nashville.
TEXAS—Alamo Iron Works, Brownsville; Corpus Christi; Tri-State Equipment Co., 500 E. Overland Park; Conley-Lott-Nichols Machinery Co., 1311-18 E. Ervay St., Dallas 1; Conley-Lott-Nichols Company, 3601 Avenue H, Lubbock; Tri-State Equipment Co., P. O. Box 47, Odessa; Alamo Iron Works, Santa Clara and Montana Sts., San Antonio 6.
UTAH—Kimball Equipment Co., 222 W. 17th St., Salt Lake City 10.
VIRGINIA—Hampton Roads Tractor & Equipment Co., 39th St. and Kilham Ave., Norfolk; National Asphalt Corp. of Virginia, 1001 Hamilton St., Richmond.
WASHINGTON—Glenn Carrington & Co., 91 Columbia St., Seattle 4; Howard-Cooper Corp., 5045-51 - 48 Ave., S., Seattle; Intermountain Equipment Co., 811 E. Sprague, Spokane.
WEST VIRGINIA—West Virginia Tractor & Eq. Co., P. O. Box 42, Charleston; P. O. Box 587, Clarksville.
WISCONSIN—The Stone Manufacturing Co., 321 N. 25th St., Milwaukee 3; Badger Equipment Sales, Inc., Route 2, Thruway, Wausau.
WYOMING—Studer Tractor & Equipment Co., East Yellowstone Highway, Casper.
ALASKA—Glenn Carrington & Co., s/o Westward Hold, Anchorage.
CANADA—Mussens Canada Ltd., Church St., New Brunswick; Fredericton; Coleman Machinery Co., Ltd., 101 Upper Water St., New Seattle, Halifax; Mussens Canada Ltd., 65 Colborne St., Montreal 3; Ontario Equipment & Supply, Ltd., 111 Merton St., Toronto; Ontario; Frost Machinery Co., Ltd., 871 Erie St., Winnipeg, Manitoba; International Agencies & Machinery Co., 2315 Cambie St., Vancouver, B. C.; Mussens Canada Ltd., Charest Blvd., Quebec.

Gravel Subbase Gets Double Tar Seal Coat

Indiana Contractor Puts Hard Surface on Old Gravel Road In Vermont; 4-Mile Job Includes Grading and Drainage

AS the crow flies it is nearly 800 miles from Indianapolis, Ind., to Johnson, Vt. Last year the A. L. Dougherty Co. made the long jump from the Hoosier State to the Green Mountain State to do some road work for the Vermont Department of Highways. The Indianapolis contracting firm had been working in the New England area, and submitted low bids on two major road-building projects in northern Vermont. One was a 7-mile contract between Hardwick and Greensboro, and the other was a 4.16-mile contract between Johnson and North Hyde Park. Both were grading, drainage, and surfacing projects.

The Federal-Aid project covering the 4.16 miles from Johnson to North Hyde Park was on State road 100-C in Lamoille County, and was on the direct route from Burlington, on Lake Champlain, to Newport, near the Canadian border. The existing road, an 18-foot gravel surface worn thin and full of holes, was in such poor condition that traffic usually avoided that stretch in favor of the all-paved route through Hyde Park, even though it is 4 miles longer.

With a 22-foot width and a 4-inch center crown, the new pavement consists of a double tack coat of refined tar with a peastone seal, laid on a 2-inch crushed-gravel base. Under that is a 16 to 22-inch gravel subbase. Shoulders are 3 feet 5 inches wide and have a total pitch of 2½ inches. Side slopes in cuts and fills vary, according to the location, from 1½ to 1 to 4 to 1. Construction got under way in May of last year, and was completed by November 20.

Grading

In general, the alignment of the existing road was followed fairly closely, but sharp curves were flattened out and steep dips in the vertical profile were removed by raising the grade. Except for one 26-foot fill nearly 600 feet long, the embankments and cuts were shallow. On the southerly half of the job the soil was mostly clay, but this changed to sand and gravel at the upper end, providing a good subgrade for the roadway.

Most of the drainage work was located in the clay cuts near the Johnson end, and the pipe was laid by Lucien Demars of Enosburg Falls under a subcontract. Trenches were dug with a Lorain ¾-yard backhoe.

Equipment employed in the grading and gravel work included two ¾-yard shovels—a 22-B Bucyrus-Erie and a Northwest—working with a fleet of hired trucks carrying 4 to 5 yards of material apiece. As many as 16 trucks were engaged at one time, but the average in constant use was about half that number. A LeTourneau Carryall

working with a Caterpillar D8 tractor moved dirt on the short hauls.

A Gravel Job

Material for the gravel subbase, totaling 39,200 cubic yards, came from a pit just off the right-of-way. The 16 to 22-inch subbase extends the full width of the roadway out to the slope lines, and was laid in approximately 6-inch lifts. The road was kept open to traffic, and the movement of the vehicles aided in the compaction. A pair of D4 dozers spread the gravel, and the final shape



C. & E. M. Photo

A Huber 10-ton 3-wheel roller compacts a peastone seal coat over a double tack coat of tar on State Road 100-C in Lamoille County, Vt.

ing was done with two Caterpillar motor graders, a No. 12 and a No. 112. A Huber 10-ton 3-wheel roller assisted with the compaction.

Over the subbase went a 2-inch base

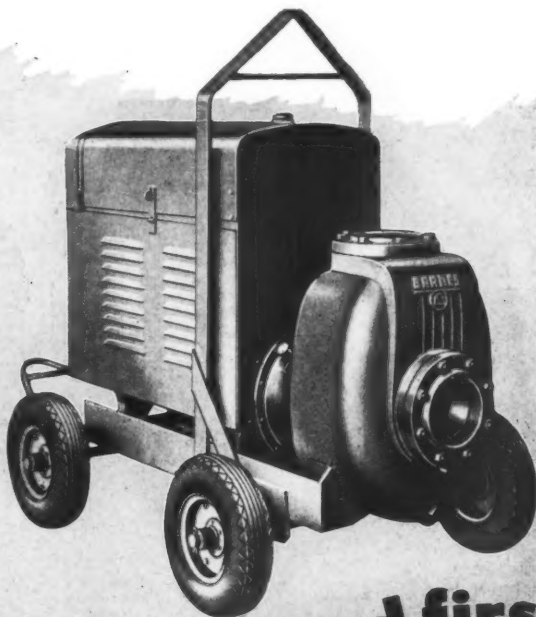
course of crushed gravel, also extended out to the slope lines. This material was obtained from the commercial plant of Albert Nadeau of Johnson,

(Continued on next page)

BARNES

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PUMPS



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1ST IN PUMPING ECONOMY —

Barnes Automatic Centrifugals deliver not 1,000—not 10,000—but 33,000 gallons of water for each gallon of gas used. That's equal to 4¼ railroad tank cars filled and overflowing. And that's pumping economy unmatched!

1ST IN SURE OPERATION —

Barnes Self-Priming Centrifugals will prime with pump body filled as low as ⅓ normal water level. Exclusive Barnes Peri-Prime feature gives surer, faster priming—with no loss in pump efficiency in recirculation!

1ST IN LASTING SERVICE —

Barnes Centrifugals are really built! The heavy duty body and impeller defy wear! The Barnes Life-time Super Seal, with its case-hardened bearing surfaces assures trouble-free service for job after job — year after year!

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BUY THE BEST — BUY BARNES

Gravel Subbase Gets Double Tar Seal Coat

(Continued from preceding page)

and was graded from 1½ inches down, about 60 per cent being gravel and the remaining 40 per cent sand. Trucks end-dumped it on the subbase, while the graders spread it out for rolling by the smooth-wheel roller.

This base was then given the first shot of RT-5 tar applied at the rate of 0.5 gallon to the square yard. The tar penetrated the gravel to the depth of about one inch. All bitumen was supplied and applied by the Barrett Co., and came from plants in either Worcester or Malden, Mass. Barrett engaged Vermont Bituminous Service of Bennington, Vt., to do some of the shooting.

Double Tack Coat

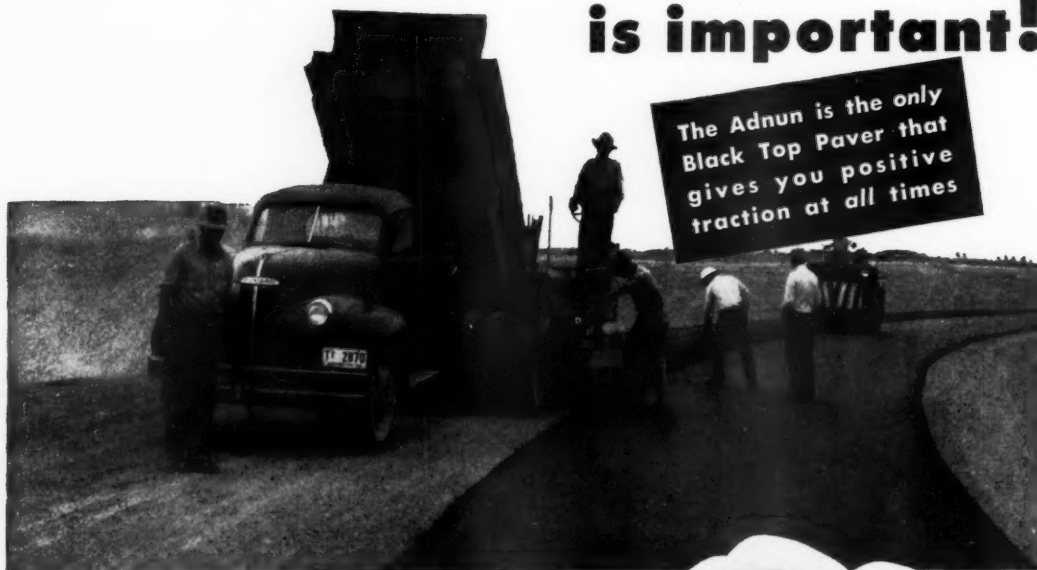
Bitumen was shipped by rail in tank cars to a siding of the St. Johnsbury & Lake Champlain Railroad in Johnson,



C. & E. M. Photo

Time off for the camera. Left to right: Resident Engineer Wilbur B. McAllister; General Superintendent Doyle Borgius; and Superintendent Edwin Goodwin.

POSITIVE TRACTION is important!



WHEN you are handling a truck load of stone or asphalt mix with a Black Top Paver, positive traction is important.

The Adnun brings you four wheel drive—full power on all four wheels at *all* times. There is no loss of traction when turning as there is when braking one crawler to steer. There is no need for oversteering that results in correction and hand work. Steering is smooth and positive without jerking. Wheel design brings you simplicity and ease of upkeep and frees you from the wear and repair characteristic of crawler mechanism.

Behind this is the large, heavy duty engine—50 hp.—25% more engine power than the next most powerful spreader.

These are just a couple of the things that cut costs and make the Adnun fast on the job for its owners. Have you seen the booklet "11 Basic Things"? Let us send it.

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Subsidiary of Blaw-Knox Co.

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ADNUN

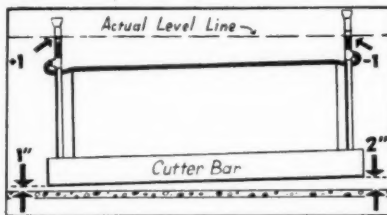
TRADE MARK REGISTERED

BLACK TOP PAVER



Being the only Black Top Paver with a one piece screed having a direct lift, the Adnun for the first time in the history of black top paving makes possible the holding of a positive level course over old road. The Adnun Liquid Level assures accurate correction for any slope at any station.

Ask About the Adnun Liquid Level



where it was heated by a Cleaver-Brooks tank-car heater and then transferred to the Barrett distributor—a 1,500-gallon air-driven rig mounted on a Mack truck. The first shot with the RT-5 tar was applied by this distributor at a temperature of around 150 degrees F. It was done half-width at a time in sections 2,000 to 2,500 feet long and while one half of the road was being tacked, traffic used the other half.

After this initial application had set for 1½ to 2 hours, it was dusted over with a light cover of sand spread on by hand from trucks. The work proceeded from the south to the north end of the job. When both halves of the road were done, the contractor waited for about seven days, or until this first tack or prime had hardened, before putting on the seal. Vermont Bituminous Service helped with the seal using its 1,048-gallon Etnyre distributor mounted on an Autocar. This unit also worked on the initial application, hand-spraying with a hose was done at intersections when the larger distributor worked the straightaway.

The seal was put on the full 22-foot width at a temperature of 200 degrees F and at a rate of 0.25 gallon to the square yard. It consisted of a blend of 40 per cent RT-9 and 60 per cent RT-3 and was applied in 1,000-foot sections at a time. At the start of each run a 36-inch strip of building paper was spread across the road to lap the joint and thus avoid any fat spots of excess bitumen.

Peastone Seal

Within ten minutes after the tar was applied it was covered over with a single thickness of ¾-inch peastone put on from Buckeye spreader boxes hooked to the tailgates of trucks. Two boxes were used, and the pair of trucks hauling the stone worked nearly abreast as they backed over the road. As the boxes were 10 feet wide, they covered only the inner 20 feet, but enough stone was discharged so that men with rakes and shovels could spread the material over the one-foot outside strip on each side.

Then the peastone was rolled in by a Huber 10-ton 3-wheel roller. About 100 cubic yards of this cover material was required for a mile of pavement. Next a fog coat of the same bitumen blend was put on at the rate of 0.1 gallon to the square yard, and covered with a thin layer of washed sand applied from the spreader boxes. Both the peastone and the sand came from the same local supplier of the crushed gravel.

Because of the heavy traffic that is anticipated over this 4.16-mile cutoff, it is expected that a higher type of blacktop pavement will be required after a couple of years. Either a mixed-in-place or plant-mix mat, 2½ inches thick, will probably be laid over the present double bituminous seal coat.

(Concluded on next page)

ROAD BUILDERS — IT'S SENSATIONAL!

DRAGS PECKERWOOD DRAGS

STEEL SPRING WIRE ROAD BROOMS

MADE IN ANY C-O-N-T-I-N-U-O-U-S LENGTH UP TO 12 FEET

WIDTH 6 INCHES—IT'S DIFFERENT ASSEMBLE YOUR OWN—IN ANY SHAPE REQUIRED—IN MINUTES, NOT HOURS

NO FRAME REQUIRED

MADE WITH KILN DRIED 6" WIDE HARDWOOD AND HEAVY SPRING STEEL WIRES TRIPLE OUT EACH HOLE. NOT STAPLE SET

THIS IS IT! ORDER NOW

ILLUSTRATION OF 10-FOOT LENGTH ONLY \$3.50

RUNNING FOOT F.O.B. K.C., MO.

NOTICE! Our 15' length Unit Drag 3" wide with the two bolts that fits your frame, still \$2.50 ea.

SINCE VAN BRUSH MFG. CO., 1931 327 SO. WEST BLVD., KANSAS CITY 8, MO.

Quantities and Personnel

Major items in this road improvement contract included the following:

Common excavation	28,000 cu. yds.
Rock excavation	3,400 cu. yds.
Borrow	5,200 cu. yds.
Gravel subbase	39,200 cu. yds.
Crushed gravel base	4,750 cu. yds.
Bitumen for double tack coat	39,700 gals.
Underdrain	1,400 lin. ft.

A. L. Dougherty Co. employed an average force of 25 on the project. Doyle Sorgius is General Superintendent for the firm, and Edwin Goodwin was Job Superintendent.

For the Vermont State Highway Department, Wilbur B. McAllister was Resident Engineer assisted by Edward Glysson. The Department is headed by Paul H. Gates, Commissioner, with Hubert E. Sargent, Chief Engineer. H. W. Marsett is Highway Engineer, and F. C. Coates is Construction Engineer.

Provision of Funds

Is Only Highway Cure

"You got us out of the mud, now get us out of the muddle" is the plea of highway-user groups and motor clubs to the highway engineer. But the unhappy engineer is not a magician. Without money he and the highway departments can do nothing. The moment this subject is mentioned, however, a cry of propaganda goes up from the very organizations that are clamoring for relief from traffic congestion and worn-out highways. So C. H. Buckius, Chief Engineer, Pennsylvania Department of Highways, told a centenary meeting of the American Society of Civil Engineers at Philadelphia. Though our modern turnpikes have done much to reduce traffic congestion in their operating areas, he said, it is still the public official's duty and responsibility to provide adequate free highways. There is no disagreement about our highway needs. But too much emphasis has been placed on the engineering aspects of the situation and not enough on providing the necessary funds. The fundamental fact, said Mr. Buckius, is that the obstacles are about 90 per cent financial and 10 per cent engineering.

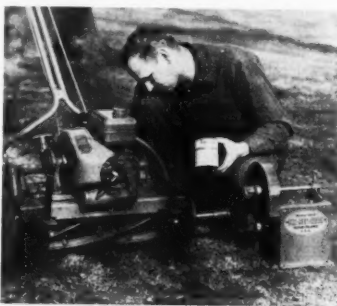
The prime responsibility for financing must be at state and local levels; larger Federal-Aid appropriations won't get us anywhere, unless it's into a coil of red tape. About half the states have been demanding of their state governments that motorists' taxes must be utilized for highway purposes only; what is really needed is an amendment to the Federal constitution along the same lines, since it is the Federal government which has been the greatest exponent of diverting motorists' taxes. Withdrawal of the Federal government from the field of gasoline taxation, with the present Federal tax of 2 cents per gallon passing to the states for highway construction, would accomplish greater results than any increase in Federal-Aid appropriations. Finally, said Mr. Buckius, complete accord is needed, plus a realistic approach to the problem of sufficient funds.

Bulletin on Salt Spreader

A powered, stainless steel salt spreader which attaches to the rear of a dump body is described in a bulletin issued by Tarrant Mfg. Co., Jumel Court, Saratoga Springs, N. Y. The Scotchman is said to be capable of salting 20 miles of open highway in 48 minutes without reloading.

An impeller powered by a completely enclosed gasoline engine creates a stream of air which blows the salt particles in the desired pattern. The company points out that this method does not grind or beat the salt into useless powder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 413.



This portable power unit, the Simplex, is used for lapping-in any reel-type mower—for shop or roadside use.

Mower Lapping Unit

A portable power unit for lapping-in any reel-type mower has been introduced by The Fate-Root-Heath Co., Lawnmower Sharpener Division, Plymouth, Ohio.

Used either in the shop or on the roadside, the Simplex can be coupled

to the reel of a mower anywhere near a source of 110-volt power. Adjustable mower supports are provided, along with several sizes of reel shaft couplers and two grades of lapping compound. A reversing switch is provided to run the Simplex in either direction and the final-drive arm can be adjusted to any position from 3 to 16 1/4 inches above floor level.

The Simplex uses a 1/3-hp double-

shaft motor, and a grinding wheel or wire brush may be mounted on either shaft if desired. The drive reduction to 145 rpm is obtained through V-belts and pulleys. No gears are used. Belt tension is adjustable on both belts. The unit weighs 45 pounds and measures 20 x 10 x 14 inches high.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 425.

POWER PLANTS SPEED CONSTRUCTION

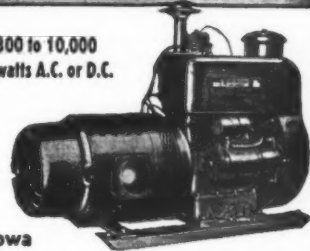
Use Power Tools—Flood Lights

Winpower Portable Electric Plants provide a dependable, low cost power source . . . speed up work performance by operating time and labor saving power tools. Winpower Nite-Hawk units give power plus built-in floodlights. Every contractor should use these high efficiency, quality built plants.

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"QUICK-WAY" truck shovels can be found "on the job" in every one of the 48 states and in 65 foreign countries as well.

Yes... "QUICK-WAY"...the original and always the standard among truck shovels, demonstrates its versatility and adaptability, as well as its superb engineering and long-lasting construction, in Alaska and the Amazon, Great Britain and British Columbia.

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Please send me complete details on "QUICK-WAY" truck shovels—four different models for large jobs and small.

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Grader Attachment Digs Lateral Canal

The job of building a 27½-mile lateral canal to bring irrigation water to the lower Tule River area of California got under way on March 1, and is expected to be completed this summer. Madonna Construction Co., San Luis Obispo, has the contract, and the lateral canal, which supplants small irrigation ditches, some of them 50 years old, runs west from Friant-Kern Canal near Porterville.

The lateral canal is of earth construction with reinforced-concrete checks. The bottom varies from 8 to 12 feet in width and the depth from 6½ to 8 feet. The outer levee slope is 1 to 1 and the inner slope 1½ to 1. Madonna Construction is using two Caterpillar diesel No. 12 motor graders with DoMor elevating grader attachments; two No. 12 motor graders without the attachments; a Caterpillar D6 tractor and a rubber-tire roller; two D8 tractor-bulldozers; two D8's with LeTourneau scrapers; and three Terra Cobras.

The plan of operation the contractor follows is for a No. 12 motor grader to work right ahead of the DoMor-equipped grader. The No. 12 without the attachment "balances" the dirt and makes a degree of leveling so there will be no hills or holes in the path of the DoMor-equipped grader. The latter is the star of the job, and builds the entire ditch right down to final grade, averaging ¾ mile of canal per day. The other equipment is used to level, excavate for check sites, compact the levees, etc. The DoMors have cut through stumps up to 6 inches in diameter on the job, and have taken various levels of hardpan in their stride.

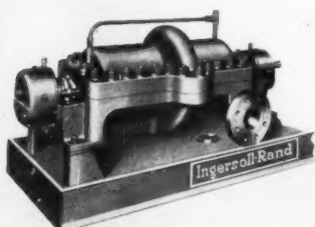
Centrifugal Pumps

Design changes in the I-R line of horizontal multistage centrifugal pumps for medium-pressure applications have been announced by Ingersoll-Rand, 11 Broadway, New York 4, N. Y. The Class CNTA are built in 1½, 2, 2½, and 3-inch sizes, and units are available with 4, 6, or 8 stages.

The pumps feature a horizontally split, smooth-bore cylindrical casing which contains the unit-type rotor assembly. This assembly is composed of shaft, impellers, and channel rings which contain the multiple-volute fluid passages. The entire rotor assembly is quickly and easily removed from and installed in the smooth-bore casing, since there are no mating ring fits or delicate alignment problems. Back-to-back grouping of the impellers neutralizes axial thrust developed by the pressure differential across each individual stage.

The interstage sealing method utilizes an alloy cast-iron or stainless-steel piston ring around the outer diameter of each channel ring. These hydraulic-type step-seal rings have a metal-to-metal fit with the casing and are automatically placed under the correct compression when the casing halves are bolted together. They are highly resistant to corrosion and unaffected by high temperatures, it is said.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 548.



Ingersoll-Rand Class CNTA centrifugal pumps are built in 1½, 2, 2½, and 3-inch sizes and are available in 4, 6, or 8 stages.



A No. 12 motor grader with DoMor attachment digs the new lateral canal in the lower Tule River area of California. Ahead of it goes a No. 12 grader without attachment, to "balance" the earth.

Cast-in-Place Piles

A folder on Cobi cast-in-place concrete piles is distributed by Eastern Concrete Pile Co., Inc., 80 Boylston St., Boston, Mass. It illustrates how the piles are driven, poured, and tested. The corrugated spiral shell is driven by a pneumatic mandrel expanded with 125-psi pressure. The company points out that the piles screw themselves into the ground, resisting both settlement and uplift.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 439.

Dayton Sales Representative

John Gray of Aurora, Ill., has been appointed a district sales representative of the Dayton Pump & Mfg. Co., Dayton, Ohio. In this position, he will be in charge of sales for the entire Rapidayton line of water systems in Illinois and parts of Iowa, Indiana, and Wisconsin.

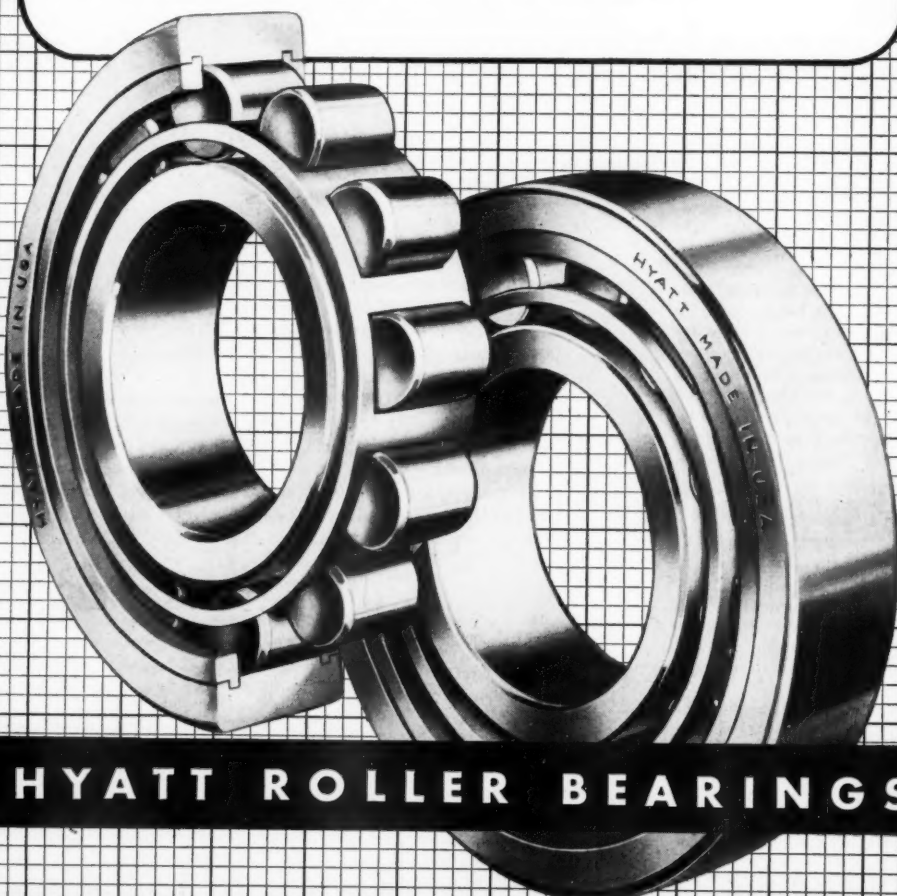
With HYATTS Built In Your Equipment Pays Out

When you buy new equipment for excavating, road construction, or maintenance work, be sure to check up on the quality of the bearings. This is mighty important.

Many of the leading equipment manufacturers have, for years, been building in Hyatt Roller Bearings so that the contractor may be sure of getting wear-free and care-free, long-lasting bearings designed for

each application.

If the specifications read "Hyatt Roller Bearings," that's your assurance that the manufacturer has used the highest quality bearings he can get to make sure you will have smooth-operating equipment that can take the shock and carry the loads required in this field. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.



HYATT ROLLER BEARINGS

Flight of a Salesman

"The contractors and dealers I contact get a real kick out of seeing me on the same day they call," says Ralph Porter, Chicago Branch Manager for the Clarke Sanding Machine Co., Muskegon, Mich. Mr. Porter covers the major part of the state of Illinois for Clarke, and doing it at 115 mph in his 4-place F24 Fairchild plane combines business with pleasure for him and his sales assistant, Ray Thornhill—another flying enthusiast. Both men are licensed pilots.

Mr. Porter has removed the rear cabin seat of his plane so he can load and carry as many as three heavy floor machines on each trip. Not only is flying the quickest way to get new and repaired machines to their destination, he says, it's the best answer to an SOS from a contractor or dealer who is in a hurry to put a machine back in business. "Selling by flying" for Mr. Porter every time.



Ralph Porter, Clarke Sanding Machine Co.'s air-minded Chicago Branch Manager, transfers a new MV8 floor-sanding machine from his plane to the car of customer Ray Fingeld at the Streator, Ill., airport.

Treatment Reduces

Concrete Absorption

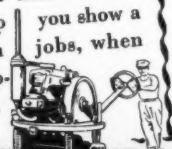
An integral treatment for producing concrete with low absorption has been announced by The Master Builders Co., 7016 Euclid Ave., Cleveland 3, Ohio. Stearolith resists water because of its water-reducing cement-dispersing action, which lowers porosity. In addition, the water-repellent stearate lowers capillarity and absorption, and the reduction of total water content increases strength and reduces volume change and volume-change cracks. It is introduced into a concrete mix either dry or mixed with water in the proportion of 0.7 pound for each sack of portland cement.

Stearolith is used where concrete slabs on the ground are not subjected to hydrostatic pressure, such as in housing projects and other low-cost construction. It is said to reduce absorption to less than 2½ per cent for oven-dry specimens. Economic benefits are claimed for projects where specifications accept concrete with this as maximum absorption, in place of 6-inch stone or gravel fill covered with membrane waterproofing paper and plain concrete poured on this paper.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 420.

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Send for our bulletins describing the Vibro-Plus Terrapac Soil Compactor. The Terrapac combines great compacting ability, deep penetration, excellent maneuverability—with light weight and low cost. They'll save time and money in operation and maintenance. They'll help you show a profit on jobs, when other equipment can't.



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Koehring's New Subsidiary

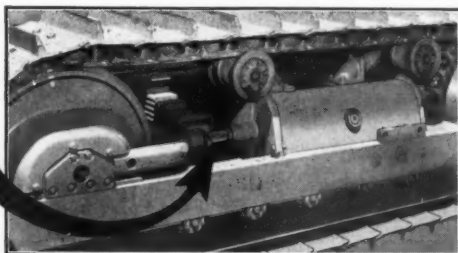
Koehring Southern Co. is the name of a new subsidiary organized by Koehring Co., Milwaukee, Wis., manufacturer of power shovels and cranes, mixers, and allied machinery. Koehring Southern has purchased the Chattanooga, Tenn., plant of the Norge Division of Borg-Warner Corp., which consists of an 800 x 120-foot factory with a total of 100,000 square feet of floor space including auxiliary buildings. It will probably be early next year before Koehring Southern is in full operation. N. J. Decker, former Works Manager of the Parsons Co., another Koehring subsidiary, is supervising the installation of new machinery and will be in charge of the start of operations at the new plant.

Koehring Southern is Koehring Co.'s fifth subsidiary. The others are: Koehring Co. of California, Stockton, Calif.; C. S. Johnson Co., Champaign, Ill.; Parsons Co., Newton, Iowa; and Kwik-Mix Co., Port Washington, Wis.

hydradjuster

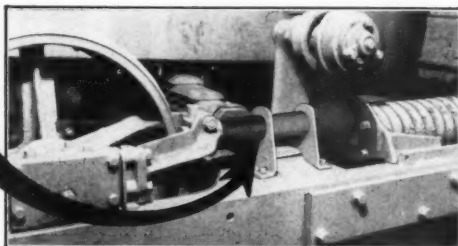
PATENT PENDING

HYDRAULIC TRACK ADJUSTER



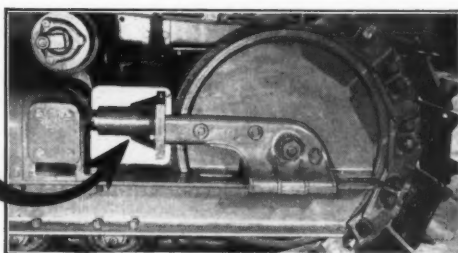
ALLIS-CHALMERS

HD-20, HD-19, HD-15, HD-9, HD-5



CATERPILLAR

D-8, D-7, D-6, D-4, D-2



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Have Jets Outmoded Our Airfield Thinking?

Problem Is One of the Most Interesting the Engineering Profession Has Ever Faced; Research Under Way

By RAYMOND P. DAY

• HAS the jet airplane made modern airfield pavements obsolete?

If usual damage to pavements at our military fields where jets are based is any gage, the answer would seem to be affirmative. Blast patterns burned 2 inches deep and 30 feet long into the surface of asphaltic concrete are not unusual. Heat-melted joint material and thermal surface cracks in portland-cement-concrete pavements give mute testimony that new forces of destruction are at work on the modern airfield.

Compounding the problems raised by jet airplanes is the fact that rocket-assisted takeoffs, 250-mile-an-hour landings, and even atomic-powered airplanes can be expected to be with us on an ever-increasing scale. For the airplane has now reached a point of development where there is not even a theoretical upper limit to speed and altitude.

This development has outmoded at least some concepts of pavement design relating to wheel loading, shear stress, heat resistance of aggregates, etc. And undoubtedly there are hosts of new problems. They're all tough. But they are some of the most interesting that the engineering profession has ever faced . . . and that it will ultimately solve, with proper research.

Speaking generally, the jets which damage pavements at contemporary fields have tailpipes set at an angle of about 12 degrees toward the ground. Even at idling speed, a blast of exhaust gas hotter than 400 degrees leaves the tailpipe at a speed of around 475 miles an hour. At military power the temperature jumps to about 775 degrees, with a velocity of 920 miles an hour. Let a navy pilot cut in an afterburner such as that service uses in its planes, and 1,800-degree temperatures with a blast velocity of 1,250 miles per hour can be expected. It is this terrific heat and blast which does the pavement damage.

More Problems Coming

If these figures sound unbelievable, it should be considered what lies in the immediate future if the military plane is to continue to develop along lines of superior performance. According to officials of both North American Aviation and Boeing Aircraft Co., tailpipe blast velocities can be expected to reach over 2,000 miles an hour with temperatures of 3,500 degrees and over. Temperatures and blast at the point of pavement contact can be expected to be as high as 1,600 degrees, with a velocity of about 690 miles an hour.

Fuel spillage will suddenly be a terrific problem, because ground crews will have to handle rocket fuels like liquid oxygen, and other fuels which leave nitric-acid residues even after combustion. And the aeronautical laws governing high-speed wings will make for sharper tailpipe impingement angles, up to 20 degrees—thus it can be seen that the problems of the pavement designer are just beginning.

America's security depends in large measure on the performance of her military aircraft. Obviously engineers must build fields for the planes, rather than the other way around, and find a way to solve the new problems.

Work Under Way

Happily, excellent starts are being

made in this direction. At both the Waterways Experiment Station and the Ohio River Division laboratories of the Corps of Engineers, the effects of jet and rocket blasts are being studied. The Navy Civil Engineer Corps and the Bureau of Aeronautics are conducting

their own research. The U. S. Air Force at Wright Field is working with the problem. Data are slowly being gathered to help the designer build stronger, denser, more heat-resistant pavements. This is all to the good, because even though such data are likely to be insufficient to overcome all the new problems as they develop, every bit of research and knowledge will help.

It seems a certainty that airfield designers are heading toward some form of ceramic pavement, especially in critical areas where tomorrow's planes will fuel, do maintenance testing, warm up, taxi, run-up, and take off. Whether these pavements can be built with asphaltic or portland cement is now problematical; this much is known: certain aggregates are totally unfit for such

pavements.

Fuel damage, heat and blast, tiny streamlined wheels with touchdown pressures over 200,000 pounds: all these will of course continue to be a problem on airfields whose pavements were built originally for propeller-driven craft. It is possible that better-quality pavements will have to be built in the critical areas of these fields, and that some form of liaison between the engineers and ground crews will have to be established so that planes are serviced and run up only in these areas. More prompt and better maintenance methods will have to be developed.

Whatever the solutions are to this sudden new problem, the engineering profession must look upon it as the most

(Concluded on next page)



Use Buckeye



...to Keep Digging



challenging and interesting it has ever faced. It must realize that fields have to be built for the planes, and that aviation is on the threshold of a tremendous performance and power increase. With this attitude, engineers will solve the problem as they have solved many of mankind's problems before.

Power Steer Booster

An automatic compressed-air-operated power steer booster that provides easier steering of trucks, tractors, and heavy road-construction equipment is manufactured by Air-O-Matic Power Steer Corp., 24 Noble Court, N. W., Cleveland 13, Ohio.

The self-contained booster is constructed mainly of anodized aluminum.



Few fittings are needed to install this power steer booster on trucks, tractors, etc. It is operated by compressed air.

Few fittings are needed to install it on old or new vehicles, and no part of the steering mechanism needs to be altered or removed. One end of the booster is fastened to a stationary member of the vehicle; the other end is attached to a movable part of the steering linkage. Only one air line is needed. The device requires no oiling, and cannot jam or freeze, the manufacturer says. There are no reservoirs to fill, no pumps to replace, and no fluid to leak away.

The rust and corrosion-resistant booster automatically assists as the driver turns the steering wheel. It is particularly helpful, according to the company, on construction jobs where the ground is soft and in sand or gravel pits. The device can be adjusted from the vehicle instrument panel.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 547.

New Gurley Sales Manager

Daniel H. Harkness has been named Sales Manager for W. & L. E. Gurley, Troy, N. Y., manufacturer of engineering and scientific instruments. Mr. Harkness retains his post as Secretary.



One of the new Rapidayton multi-stage electric centrifugal jet pumps and some of its micro-smooth parts.

Pump Incorporates New Design Features

A new line of centrifugal pumps incorporating the Axial-Flow principle has been brought out by The Dayton Pump & Mfg. Co., 500 N. Webster St., Dayton, Ohio. Pump cases and diffusers of the Rapidayton electric water pump are precision-formed instead of cast to reduce friction. Impellers are dynamically balanced. All internal parts are made of bronze or stainless steel and cannot corrode. The new cartridge-type seal can be changed quickly and easily without pump disassembly and without disturbance to the piping. A special flange for the suction and pressure lines is said to permit speedy connection of the pump to well pipes.

The Rapidayton pumps are said to develop more pressure, do up to 20 per cent more work with the same horsepower, and deliver up to 2,500 gallons per hour. They are available with 1, 2, or 3 stages for deep wells and with 2 or 3 stages for shallow wells. Deep-well units for settings up to 200 feet offer two-pipe jet assemblies for wells 3½ inches or more in diameter, and single-pipe jet assemblies for 2, 2½, and 3-inch diameters. Shallow-well units are of the centrifugal type—jet assemblies are unnecessary. NEMA standard motors range from ½ to 2 hp for deep-well pumps and from ¼ to 2 hp for shallow-well pumps. The pump can be furnished with 28, 42, 82, 120, or 220-gallon pressure tanks and fittings to make a complete water system.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 469.

Protective-Coatings Guide

A 44-page catalog on coatings for preventing corrosion, sealing out water, vaporsealing, and insulating is available from Insul-Mastic Corp. of America, 1141 Oliver Bldg., Pittsburgh 22, Pa. It describes the properties and uses of Gilsonite base protective coatings, caulking compounds, primers, and membraning material.

The catalog includes information on a special cork-filled coating which is said to perform the double function of preventing corrosion and insulating. It is recommended by the company for use in all atmospheric temperatures to prevent heat loss or to control condensation. Insul-Mastic protective coatings are applied as thick as ½ inch and the insulating coating, ¼ to ¾ inch thick. They are usually spray-applied in one operation.

The catalog contains photographs of chemical vessels, equipment, and buildings which have been protected by Insul-Mastic coatings; it includes tests and laboratory reports; and gives detailed specifications.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 16. Circle No. 436.

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Prestressed-Concrete Girders

By WILLIAM H. QUIRK,
Editor

• THE old saying "It's an ill wind that blows no one good" might very well be applied to the shortage of structural steel that has plagued the country this year. That shortage boded well for the advocates of prestressed concrete, since it led to its use in building the first major elevated floor system in the United States. The innovation is incorporated in the new dining and assembly hall for Manhattanville College of the Sacred Heart near Harrison, N. Y.

The Catholic college for women is moving its campus from the Bronx in New York City to what was once the estate of Ogden Reid at Harrison, Westchester County. The \$14,000,000 project is under construction on a 250-acre site by George A. Fuller Co., general contractor, according to a design by Eggers & Higgins, architect. Both firms have headquarters in New York City. Besides the dining and assembly

Elevated Floor System Supported on Six Prestressed-Concrete Girders; 65 Feet Long x 4 Feet Deep; No Steel Available

hall, other buildings to be readied for the September term included a dormitory, academic building, a library, and a power plant.

Decide for Prestressed Concrete

Originally plans called for structural-steel girders in the dining hall. But the contractor, the architect, and the structural engineers—Weiskopf & Pickworth—were confronted with a situation where it was impossible to obtain an allocation of 72 tons of structural steel in time to meet the construction schedule of this nondefense project. In the structural design six girders were required to support the 65 x 132-foot elevated floor system of the assembly hall which is above the dining hall on the main floor. Columns were eliminated from the design in conformity with the wishes of the owner, so the six steel girders were designed to

cover a span of 65 feet. Their depth would have been 3½ feet with fireproofing.

Reinforced concrete was discussed, but this type of design would have required 40 tons of steel rods. A new and taller building would also have had to be designed to provide sufficient ceiling height under the beams which would have had to be 6 feet deep to carry the floor of the assembly hall, and also to serve as the ceiling of the dining room.

In face of these facts relating to both structural steel and reinforced concrete, the decision was made to use prestressed-concrete girders. The Preload Co., Inc., of New York City, a consulting engineering firm which specializes in prestressed design, was commissioned to go to work. A six-girder design was established, with each member 65 feet long x only 4 feet deep.

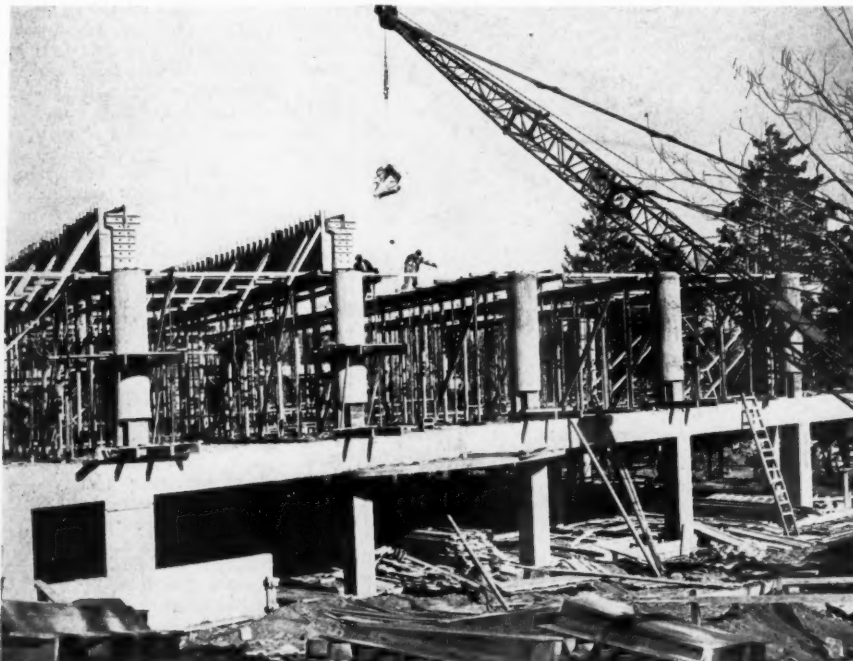
Only slightly deeper than the girders called for in the original structural-steel designs, the prestressed members use 8.08 tons of steel as against the 72 tons of the structural girders—a saving of 89 per cent, or nearly 64 tons of this critical material.

The Design

Girders are designed to carry a live load of 100 pounds per square foot, a dead load (the weight of the floor deck and flooring) of 122 pounds per square foot, and their own weight of 28 tons cast in place. The top flange is 30 inches wide x 10 inches thick; the bottom flange is 20 inches wide x 7 inches thick; and the web is 8 inches thick. The girders are spaced on 18-foot centers, and support a conventional reinforced-concrete floor slab. The ceiling for the floor below is hung from the girders.

Girders were prestressed in two stages: first to provide for the support of their own dead weight and part of

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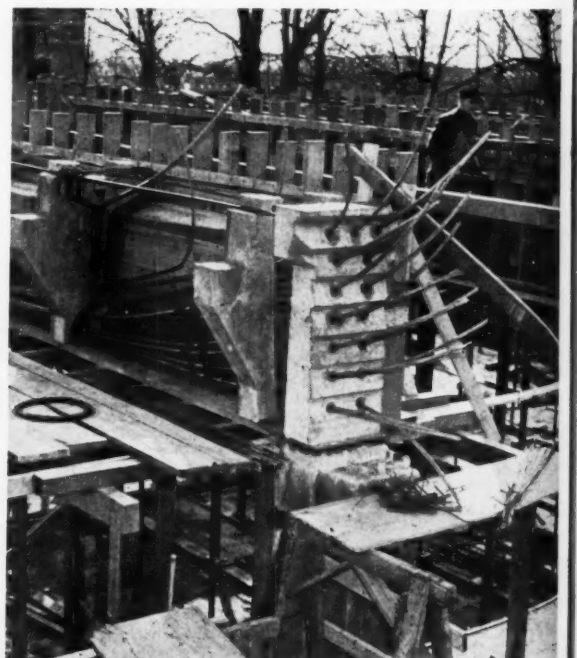
1. A precast bracket is lowered onto the formwork for one of the six prestressed-concrete beams that will support the floor system of the Manhattanville College assembly hall.



2. Workmen position the bracket. Nine of these brackets, two end anchorages, and the necessary anchor cones were all precast.



3. Twelve-wire cables in steel-tube sheaths are now placed in the formwork, of which only the bottom and one side have so far been erected. Fifteen of the 22 cables run the full girder length.



4. The remaining 7 cables sweep up before the ends and emerge from the top flange. The beam is shown ready for secondary reinforcement.

Sub for Steel Ones in Shortage

the applied permanent load, then to provide for the support of the remainder of the permanent load and the live load. The secondary prestressing was done after the floor slab was laid. Each of the girders is prestressed by 22 cables, with each cable consisting of 12 high-tensile steel galvanized wires 0.196 inch in diameter. The pull which Preload Co.'s prestressing hydraulic jack exerted on each cable was 26 tons. In the first stage the prestressing was accomplished by stressing 10 cables in each girder; in the second stage, by stressing the remaining 12.

Of the 22 cables, 15 run the full length of the girder and are anchored at the precast end blocks. The remaining 7 sweep up before the ends are reached, and emerge from the top flange at about a 30-degree angle. The latter are anchored in a V-shaped recess in the top flange so that the bearing plate is perpendicular to the line of stress in the cable. The 12 high-strength steel wires in each cable are spaced around a 3/4-inch spring core,

and are contained in a 1 1/4-inch steel-tube sheath.

Construction

Parts of the girders were precast in order to obtain the exceptionally high strength which they require, and also to avoid the necessity of erecting the complicated forms for them at the construction site. High-early-strength cement was used in the concrete, which attained a 5,000-psi rating after 7 days. For each girder, two end anchorages, nine intermediate keystone-shaped brackets, and the necessary anchor cones were all precast.

The end anchorages have 15 holes through which the full-length cables are drawn. The intermediate blocks or brackets carry on their flanges the reinforced-concrete beams on which the floor system rests. The latter are set on 8-foot centers in the wooden forms in which the girders are cast.

In general, the construction of the girders adhered to the following sequence of operations, although some

steps were carried on concurrently:

1. Precasting of end anchorages, anchor cones, and brackets.
2. Fabricating the 12-wire prestressing cables.
3. Erecting formwork and placing the precast members, prestressing steel, and standard steel—a small amount of web and temperature reinforcement.
4. Pouring the main portion of the girder with 5,000-psi concrete.
5. First-stage prestressing and grouting of cables after the concrete attained the strength required.
6. Pouring the floor system which rests on the girders.
7. Second-stage prestressing and grouting of cables.

Prestressing reached a maximum of 150,000 psi, but after losses the final stress was 120,000 psi. Total prestressing was 460 tons. The girders were cast in place instead of being prefabricated, in order to eliminate the heavy equipment needed to lift them into position. Ready-mix concrete was delivered to the site, discharged into buckets, and

raised to the forms by a P&H crawler crane. The crane also handled the precast members.

The Manhattanville College project marks the first time in this country it is believed, in which girders were poured in place and prestressed in two stages. Work on the prestressing part of the job started in January and was completed in April.

According to Theory

The Manhattanville girders conform to the accepted theory of prestressed design: that undesirable stresses in a load-carrying structure can be eliminated by introducing into it artificial stresses which are directly opposed to those to which the structure will be subjected when the load is imposed. In this construction, as noted, the principle is applied by drawing high-tensile steel wires through the concrete girders under such extreme tension that the concrete is always endowed with ample compression to counteract any

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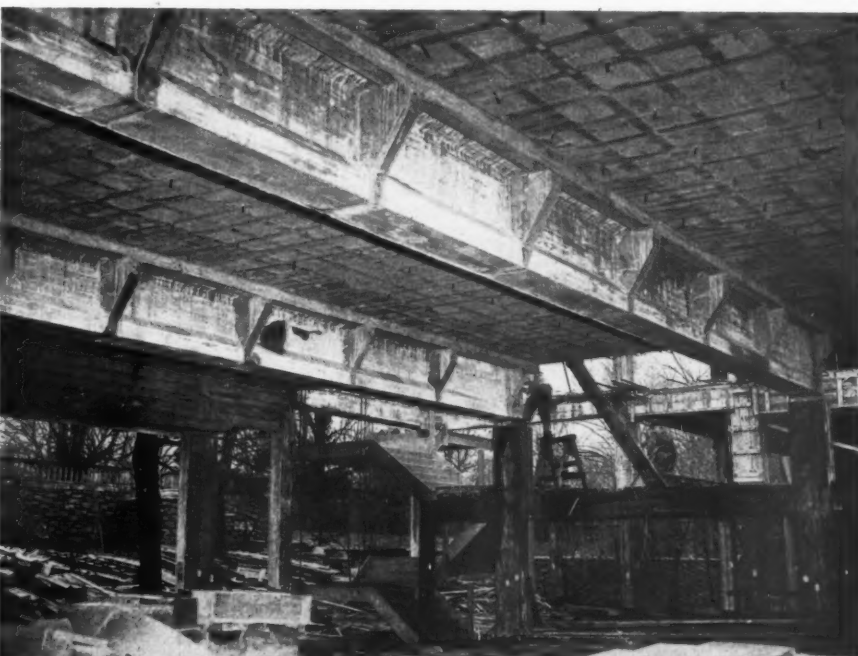
5. First-stage prestressing of 10 cables takes place when the girders have been poured in place and attained their required strength.



6. Second-stage prestressing of the remaining 12 cables takes place when the floor that rests on the girders has been poured. Here wires stick up through the assembly-hall floor, ready for prestressing.



7. A workman measures wire elongation during the second stage. The hydraulic jack exerts a 23-ton pull on each cable.



8. Here is the underside of the assembly-hall floor, showing the prestressed girders. Note how the brackets carry on their flanges the reinforced-concrete beams which support the floor slab.

Prestressed Girders Substitute for Steel

(Continued from preceding page)

anticipated tension load.

This particular achievement highlights a distinctive phenomenon of prestressed concrete—that a structural member made predominately of concrete obtains the same load-carrying capacity as a structural-steel member, but with only a slight increase, about 7½ per cent, in depth. This is because concrete, in itself, although it has great strength in compression, which literally pushes it together, has little resistance to tension stresses, which act to pull it apart and cause it to crack—while steel's best quality is its high tensile strength.

Since it was introduced in this country eighteen years ago, prestressed concrete has been used chiefly in the construction of huge tanks, pressure pipe, and bridges. In Europe, however, it has been employed extensively in floor systems and other elements of building frames, where high cost makes short supply, in effect, the normal status of structural steel.

Waterproofing Powder

Builders and architects who use lightweight insulating aggregates in their roof decks, walls, ceilings, or floors can now get a water-resistant finish with insulating properties, claims American Fluresit Co., 4011 Red Bank Road, Cincinnati 27, Ohio.

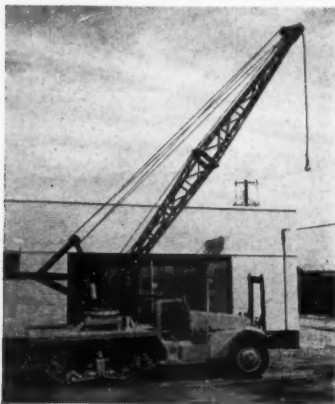
Adding Fluresit to the mix, it is claimed, prevents capillary wicking of moisture into the hardened concrete, and thus minimizes heat loss through floors, walls, or ceilings. The manufacturer also states that on floor slabs integrally waterproofed with the powder there will be no loosening or buckling of asphalt tile or linoleum, no saponification, blistering, or peeling of paints. The powder can be used in all portland-cement mixes. According to the manufacturer, it reduces the surface tension of the water, promotes the hydration reaction, increases the yield, and improves the workability without decreasing the strength of concrete.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 445.

A Half-Track Crane

A one-man operated crane mounted on a half-track is made by Zeligson Truck & Equipment Co., P. O. Box 5008, Tulsa 16, Okla. It has a full 360-degree swing, and a powered boom and load line. Powered by a 160AX White engine, it will swing, raise or lower the load line, and raise or lower the boom simultaneously. Rubber tracks permit highway travel.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 546.



The Zeligson half-track crane is operated by one man and has a 360-degree swing. It is powered by a White engine.

Davey Export Subsidiary

Davey International, Inc., is the name of a newly formed subsidiary of Davey Compressor Co., Kent, Ohio. The new company, which will handle export sales of Davey air compressors and truck equipment in the western hemisphere, will operate in Central and South America, Mexico, and the West Indies. Heavy-duty power takeoffs for trucks, portable light and power units, mobile machine shops, and field service units are other items the company will handle.

F. C. Kieser, for the past three years Export Manager of Davey Compressor Co., is Sales Manager of Davey International, Inc.

High-Tensile-Steel Prestressing Bars

High-tensile alloy-steel bars for use in prestressed-concrete construction are manufactured by Stressteel Corp., 211 E. 37th St., New York 16, N. Y. Stressteel comes in lengths up to 80 feet and in diameters from ½ to 1½ inches. It has an ultimate stress of 145,000 psi. End anchorage is provided by a tapered thread which engages a nut. The nut, with steel bearing plate, is said to develop 100 per cent of the ultimate strength.

The company points out that even on small-span structures the use of bars instead of wire can reduce prestressing and anchoring costs. On a new bridge

project, the company reports, 6,534 units of Stressteel were used, compared to an estimated 52,272 strands of wire. Placing, stressing, and anchoring the bars takes between 25 to 45 man-hours per ton, as against 130 to 150 for wire, the manufacturer claims.

When unbonded prestressing is specified, the bars are coated with mastic, wrapped in paper, and positioned in the form. For bonded prestressing, the bars are either housed in a flexible metallic sheath or in holes in the concrete made by rubber tubing. Grout is injected around the bars. Tensioning is done with a hydraulic jack.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 451.

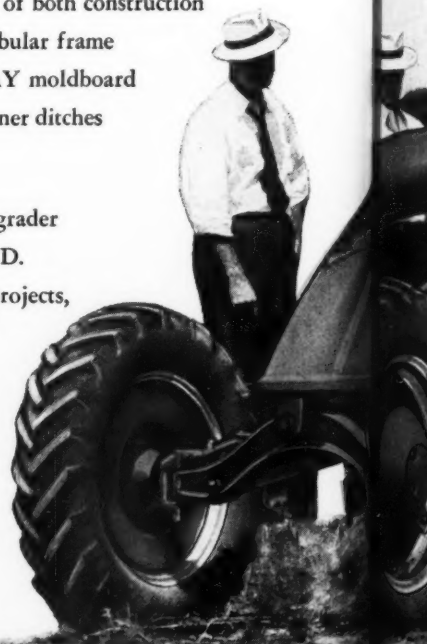
"Specs" can't begin to tell the story —we invite you to See the model

Only by watching the Model D *at work* will you believe that a grader costing so little can do so much . . . and that's just what your Allis-Chalmers dealer wants you to do. See how tandem drive design with engine over the drive wheels helps the "D" do a better job of both construction and maintenance. Look closely at how that tubular frame absorbs shocks . . . and how the ROLL-AWAY moldboard enables it to move bigger windrows . . . cut cleaner ditches . . . maintain more miles per day.

Yes, even if you've always been a heavy-grader man, you owe it to yourself to see the Model D. It's *all grader* . . . handles *all jobs on some projects, some jobs on all projects*. So let your nearby Allis-Chalmers dealer give you a working demonstration *soon*.

ROLL-AWAY is an Allis-Chalmers trademark.

- ★ 34.7 horsepower
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- ★ Four speeds forward to 25.6 mph.
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THE NEWEST, FINEST LINE ON EARTH!

Power Sod Cutter With Vibrating Blade

A self-propelled sod cutter said to be capable of cutting up to 1½ acres of sod per day is made by Frank Phillips, 619 S. 15th St., Lafayette, Ind. An 8-hp Briggs & Stratton engine moves the machine at a walking pace while the vibrating blade cuts both sides and under the sod. The blade moves back and forth at over 1,000 rpm shearing off strips of sod up to 16 inches wide. A guillotine-type blocker cuts off the strip at any predetermined length. The unit weighs 700 pounds and will cut ¾ to 2 inches deep.

Further information may be secured from the company. Or use the Request



The Phillips power sod cutter moves along at a walking pace and can cut up to 1½ acres of sod per day. It weighs 700 pounds and cuts ¾ to 2 inches deep.

Card that is bound in at page 16. Circle No. 417.

Broadside on Track Roller

A track roller with one-piece shell is the subject of a broadside prepared by Craig Carroll Co., 1704 S. E. 22nd Ave., Portland 15, Oreg. A cam-activated pump in each pressure roller forces oil to all bearing surfaces and every revolution of the roller shell pumps lubricants to all bearings. The Flow-Away principle passes a small amount of lubricant out past the seals, keeping out dirt and abrasives.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 438.

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PATENTED TANDEM AXLE ASSEMBLY—Featuring unusual lengthwise and sidewise wheel accommodation to irregularities in the road. Use of full width tubular forged, heat treated axles with CAMBER.

FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

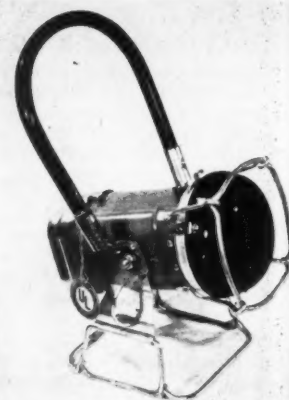
TRANSPORT TRAILERS, INC.
TRANSPORTATION ENGINEERING A SPECIALTY
CEDAR RAPIDS, IOWA, U.S.A.

New Flashing Lanterns

A safety red flashing lantern for use in all Class 1, Group D hazardous locations, as well as other spots requiring a warning or marking light, has been introduced by The Justrite Mfg. Co., 2061 N. Southport Ave., Chicago, Ill.

The portable battery-powered Model 2146-S houses a red lens and a sliding switch assembly controlling two bulbs. One position of the switch produces a steady red beam, which can be instantly changed to a flashing red light merely by moving the switch.

Additional safety features of the lantern include a kick-out bulb socket which eliminates the danger of explosions in the event of a broken bulb, heavy wire guard which protects the globe against breakage, sparkproof construction of all protruding parts, and a movable mounting base which makes the beam adjustable to any desired angle. In addition, it has the approval of Underwriters Laboratories, Merchant Marine Technical Division. Blinking



Moving a switch changes this Justrite safety lantern from a steady to a flashing red beam.

power of the 2146-S lantern is good for over 52 hours of continual burning.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 545.

Data on Cable-Reel Jacks

A 2-page bulletin on jacks for lifting and holding heavy cable reels is issued by The Duff-Norton Mfg. Co., Preble Ave., Pittsburgh 30, Pa. The jacks are available in 5, 10, and 15-ton capacities and handle cable reels from 20 to 96 inches in diameter.

The bulletin illustrates and describes a three-hook ratchet reel jack mounted on an oak T-frame base, ratchet jacks with multiple and adjustable hooks, and screw-type reel jacks with steel A-frame bases. It also describes jacks for pulling and straightening poles without digging.

This literature may be obtained from the company by requesting Bulletin AD-26, or by using the Request Card at page 16. Circle No. 464.

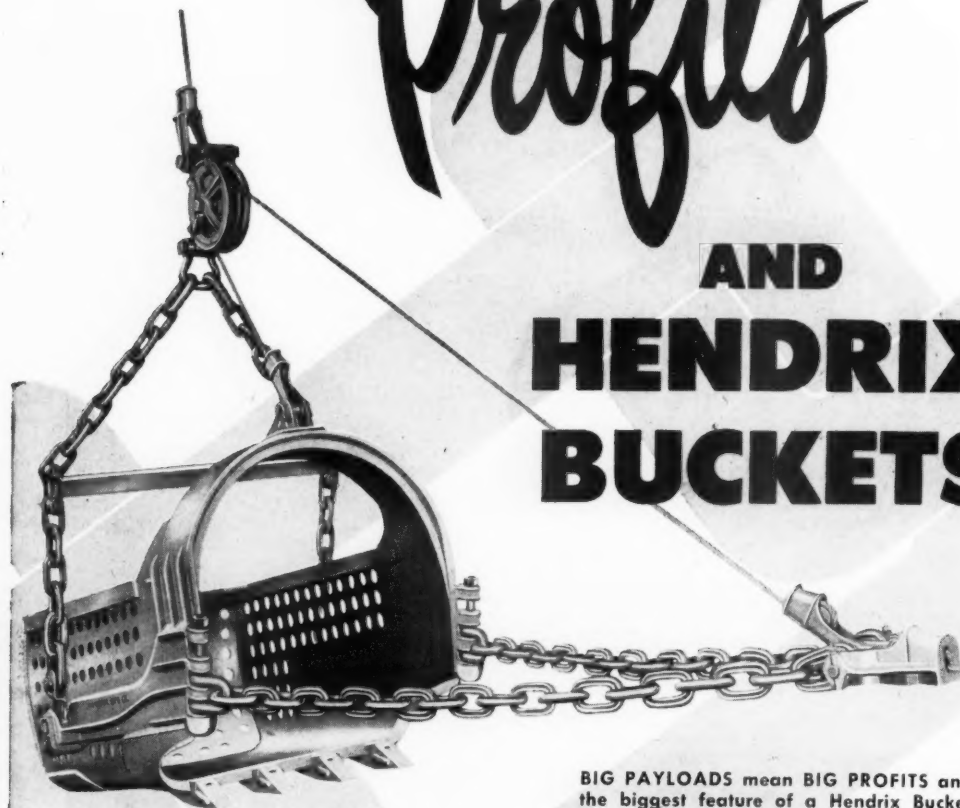
Central Paint Buys Hydroban

Central Paint & Varnish Works, Inc., Brooklyn, N. Y., has bought the controlling interest in Hydroban, Inc., manufacturer of a primer, sealer, and water repellent for use in the building industry. Henry G. Voorhis, who was General Manager of Hydroban, Inc., is staying on as Vice President in charge of Hydroban sales.

There's a Direct Connection Between...

Profits

AND HENDRIX BUCKETS



BIG PAYLOADS mean BIG PROFITS and the biggest feature of a Hendrix Bucket is its payloads! Perfectly balanced, this is one bucket with which operators can easily get MAXIMUM PAYLOADS EVERY TRIP. Its all-welded construction assures rugged strength during all operations. If it's BIG PAYLOADS you want... if it's BIG PROFITS you're after... it's a HENDRIX you need!

HENDRIX
Lightweight DRAGLINE
BUCKETS

Hendrix Buckets May Be Special Ordered
Without Perforations

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD - LOUISIANA

FOUNDATION
CONSTRUCTION

CAISSONS
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DRILLED AND
UNDERREAMED

PIERS

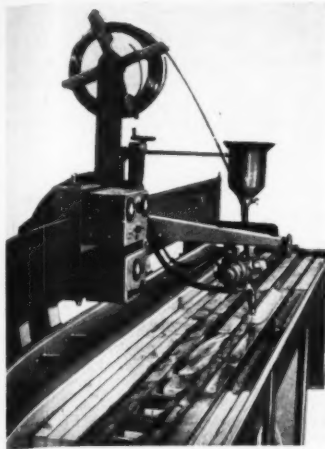
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The ConServall is an automatic welder and resurfacer for track links, rolls, idlers, and sheaves. Welding length and the space between welds are automatically controlled.

Welding Unit Repairs Worn Track Surfaces

An automatic welder and resurfacing unit for reclaiming track links, rolls, idlers, and sheaves has been introduced by Penn Tool & Machine Co., Danville, Ill. ConServall automatically welds or resurfaces any part or work piece requiring a horizontal pass. With the addition of a power-driven variable rotator, it will resurface circular work.

Complete tracks are placed in the trough. Welding length and space between welds are automatically controlled and indexed by cams which are adjusted to handle any type of track. The resurfacing operation is done by the submerged-arc method. No flash is visible at any time.

The standard ConServall is 30 feet in length, made up of three 10-foot sections. Each section is complete with work table or trough and rail for supporting the travel carriage and rack. The sections are matched and an assembly of two or more becomes a unit. Units can be made up of multiples of the standard section.

The welding head is supported by accurately machined slides which provide vertical and horizontal adjustments to meet welding or resurfacing requirements without shifting the work piece.

The 5-foot-long carriage track extension permits the welding head to move over the rotator when circular work is to be handled. The ConServall cross slide, with its conveniently located handwheel-controlled traverse, insures smooth overlap of the weld bead, claims the company. The rotator spindle speed is variable, from 0 to 7½ rpm. The angle of the spindle is adjustable from horizontal to vertical.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 544.

Scholarship Winners Named

Ten prospective civil engineers have received \$1,000 scholarships and the opportunity to attend any one of 125 accredited colleges in the country offering a degree in civil engineering. These high-school graduates, representing 24 states, were selected the winners of the American Institute of Steel Construction's third scholarship program. They were chosen from a group of 80 high-school seniors nominated by 48 steel-fabricating companies throughout the nation.

The winners and their sponsoring companies are: Mark Cohen, Grand Iron Works, Inc., New York, N. Y.; Eugene Erwin, Fort Smith Structural Steel Co., Fort Smith, Ark.; Jerry A. Fulk, Mississippi Valley Structural Steel Co., Decatur, Ill.; Ronald A. Massa, Schacht Steel Construction, Inc., Hillside, N. J.; Frank M. Newcomb,

Gate City Steel Works, Omaha, Nebr.; Edward S. Perry, Dreier Structural Steel Co., Inc., Long Island City, N. Y.; Donald J. Ross, John E. Cox Co., Inc., Fall River, Mass.; George J. Strom, Schrader Iron Works, San Francisco, Calif.; Kenneth B. Wiesner, Stupp Bros. Bridge & Iron Co., St. Louis, Mo.; and Donald Wintringer, August Feine & Sons Co., Buffalo, N. Y.

Bulletin on Trencher

A 4-page bulletin on a wheel-type digging unit for drainage and utility trenching is issued by Parsons Co., Box 431, Newton, Iowa. It describes the Model 202 Trenchliner, a fully crawler-mounted unit with a maximum digging capacity of 18½ fpm.

The Trenchliner is equipped with square or round-bottom buckets that cut trenches 13 to 31 inches wide to a maximum depth of 6 feet. It has 30 digging feeds ranging from 6.2 inches to 18½ fpm. Bucket fronts can be changed from cutting lips to Tap-In

teeth to meet any soil conditions.

Features cited in the bulletin include enclosed friction clutches for accurate control of wheel depth to grade; all-welded unit frame and truck rollers mounted on antifriction bearings; shiftable and reversible belt conveyor for discharging soil to either side of the machine; enclosed main gears running in a constant oil bath; and a choice of either 52-hp gasoline or 55-hp diesel

engines.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 457.

Jahn Sales Office Moves

The Sales Office of Jahn Trailer Division of Pressed Steel Car Co., Chicago, Ill., has been transferred to the Division's Hegewisch plant at 136th St. and Brandon Ave., Chicago 33.

Do your sealcoating and ice control jobs the fast easy Swenson way. Spreads salt, chloride, sand or cinders any width or amount desired.

Free Information

Swenson Spreader & Mfg. Co.
Lindenwood, Illinois



Minimize
PITTING
Eliminate
PATCHING



Insist on
GLOBE FORM
GREASE

The Wonder Grease for Concrete Forms

REGARDLESS of whether you use steel or wooden forms for concrete work — you can apply Globe Form Grease by spray, brush, or swab. This time-tested paste emulsion will reduce peeling and pitting to a minimum when forms are removed, and practically eliminate patching.

Due to its special adhering qualities, Globe Form Grease requires only a thin coating for utmost effectiveness. In fact, one gallon adequately covers approximately 200 square feet! And in addition — Globe Form is stainless, leaves a whiter smoother surface, and eliminates the need for painting.

Why not write for full particulars today? Once you use Globe Form Grease, you'll understand why engineers and contractors hail it as the "wonder grease" for concrete forms.

OILS and
GREASES
for every purpose
DIESEL
STEAM
AUTOMOTIVE

Write for descriptive
booklet of all Borne,
Scrymser products.

BORNE
Since 1874
SCRYMSER

Our Laboratory
Facilities are
always at your
disposal

BORNE, SCRYMSER COMPANY

ELIZABETH, N. J. • CHARLOTTE, N. C.



The Champion all-metal electric spray gun delivers 90 pounds of pressure at 7,200 strokes per minute — for spraying paints, oils, insecticides, etc.

Electric Spray Gun

An improved all-metal electric gun with adjustable spray has been intro-

duced by Champion Implement Corp., 175 E. 87th St., New York, N. Y. The trigger-type Champion has a high-speed electric pumping device which is said to deliver over 90 pounds of pressure at 7,200 strokes per minute. No compressor is needed. The gun may be used for spraying paints, chemicals, oils, insecticides, etc.

The self-contained gun is made of stainless steel, is easily cleaned, and will not clog, the company says. It has a vibrator motor in the balanced handle, and a 25-ounce flint glass jar and U/L-approved 8-foot cord are supplied with every model. It uses ac current; 110-volt light socket.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 447.

Euclid Board Elections

At recent elections to the Board of Euclid Road Machinery Co., Cleveland, Ohio, Stewart F. Armington, formerly Vice President, was named Chairman in

succession to his father, G. A. Armington. The latter was elected Honorary Chairman after serving as Chairman since the formal incorporation of the company in 1931.

Other elections are: G. E. Armington, Vice President, Engineering, in place of Stewart Armington; Hugh T. Mon-

son, Vice President, Manufacturing; E. H. Newby, Vice President, Controller. Re-elections include: R. C. Armington, President; E. F. Armington, Vice President, Sales, and Secretary; and J. L. Hinckley, Treasurer. Last year's company directors were re-elected for the coming year.



Straight Down to Paydirt!

Designed for maximum down pressure through toughest conditions, Baker Hydraulic Blades go down positively and stay down positively—with the exact bite desired—fingertip-controlled by the operator.

Regardless of blade tilt or angle, Baker's superior design provides straight-line force through hydraulic cylinders to blade—permitting nearly entire weight of tractor to force blade straight down to pay dirt!

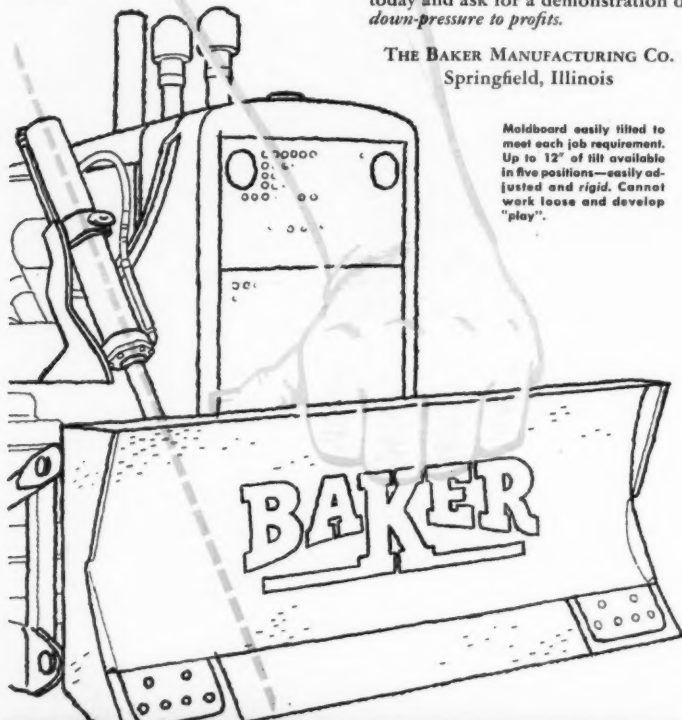


The versatile line of Baker Bulldozers, Graders, and Root Rippers—all interchangeable—is manufactured exclusively for Allis-Chalmers tractors. Three mountings are available: Engine-mounted hydraulic; frame-mounted hydraulic (the revolutionary 9-X "no-pushbeam" Dozer), and cable-controlled types.

Contact your Baker, A-C Dealer today and ask for a demonstration of down-pressure to profits.

THE BAKER MANUFACTURING CO.
Springfield, Illinois

Moldboard easily tilted to meet each job requirement. Up to 12° of tilt available in five positions—easily adjusted and rigid. Cannot work loose and develop "play".



Baker—The most versatile line of tractor attachments

Only **TRIPLEX** BACKFILL TAMPERS offer you these **BIG** Advantages

FAST 75 sq. in. of effective compaction area pounded and vibrated at the same time, resulting in 5 times the speed of work by one man.

HIGHER LIFTS 20% higher lifts and still meets specifications. No wasted energy in recoil.

UNIFORM COVERAGE Easy to control, wide pattern makes systematic coverage of a compaction area easy.

EFFICIENT Only 1/2 inch vertical movement of unit allows ease of control. One man can do 5 men's job with less effort.

SAFE The hard-hitting butts are held away from the operator's feet by the wheelbarrow type handles.

AIR CONSUMPTION A standard 105 cubic foot per minute portable air compressor is entirely adequate for the Triplex, which is accomplishing the same work that ordinarily would require a 210 c.f.m. compressor.

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988 CHEROKEE STREET DENVER 4, COLORADO



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Durable, long-lasting . . . made with the proper crushing, beam, shock and bursting properties for maximum strength. Desirable qualities in any pipe, you'd say?

Warren Cast Iron Pipe stays in service . . . its lasting qualities have been proved by excavated pipe that has been underground for 93 years . . . and still in good condition!

Made in all sizes from 2" to 84" with all types of joints. Special castings in medium to heavy weights in many non-standard patterns to help you solve those problems that require "different" installations. Also available in gray iron and Meehanite iron.

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WARREN
CAST IRON PIPE . . .
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Bell & Spigot Pipe • Flange Pipe • Mechanical Joint Pipe

Flexible Joint Pipe • Short Body Bell & Spigot Specials

WARREN PIPE CO. OF MASS. INC. 75 FEDERAL ST. BOSTON, MASS.

95 Years of Continuous Service

Dipper-Type Dredge Makes Harbor Deeper

A Million-Yard Contract Extends 40-Foot Depth to the Head Of Boston Harbor; 14-Yard Bucket Digs Into Clay Bottom

(Photo on page 1)

A SIGNIFICANT part of the general improvement of Boston Harbor, Mass., was the recent extension of the 40-foot channel from Commonwealth Pier No. 1 to the head of harbor at the mouth of the Mystic and Chelsea Rivers. This section, 6,500 feet long x approximately 650 feet wide, was deepened from 35 to 40 feet by the Great Lakes Dredge & Dock Co. of Chicago, Ill. The job was handled from the New York City office, Atlantic Division of the dredging firm under an \$812,050 contract awarded by the U. S. Army Corps of Engineers, New England Division. Work got under way in April, 1951, and was finished last November, several months ahead of schedule.

The 40-foot main channel into Boston Harbor begins out in Broad Sound, the gateway to the sea, and extends past the anchorage in President Roads and on into the inner harbor. After passing between U. S. Navy Drydock No. 3 and Logan Airport, the deep channel reaches the big piers of downtown Boston on the west and Commonwealth Pier No. 1 of East Boston on the opposite shore. Above that point the depth formerly lessened to 35 feet, but the new dredging project now assures 40 feet of water the entire length of the main ship-channel.

Deep water 8 miles in from the ocean will permit the biggest vessels to reach the reconstructed Hoosac Piers and the new Mystic Pier No. 1 built by the Port of Boston Authority just above the U. S. Navy Yard at Charlestown. The dredging contract contained the single item 1,100,000 cubic yards; and of this total about 5 per cent was sand, 20 per cent was bottom mud, and the remaining 75 per cent was the soft blue clay that is common to all of Boston Harbor.

A Dipper-Dredge Job

To deepen this portion of the channel 5 feet, Great Lakes Dredge & Dock Co. brought to the job the Crest, one of the biggest dipper-type dredges in the country, equipped with a 14-yard bucket. Because of the great length of its spuds, 85 feet, the section of channel over the Sumner vehicular tunnel connecting Boston and East Boston was done by a smaller dredge under a sub-contract to the Bay State Dredging Co. of East Boston.

Bay State used its No. 4 dredge working with a 5-yard clamshell bucket and powered by steam; its hull is 84 feet long x 34 feet wide. The No. 4 dredged a 100-foot-wide swath over the tunnel, 50 feet from the center line on each side. It also handled a 1,000-foot section at the lower end of the improvement from Commonwealth Pier north. Total excavating done by the

subcontractor amounted to about 130,000 cubic yards.

The rest of the contract, dredged by the Crest, was divided into six sections, the longest being 2,700 feet at the north or upper end of the harbor. The maximum cut or bank depth was 10 feet, which usually occurred along the outer limits of the channel. But the average depth of cut into the harbor bottom was 6½ feet. While the contract called for a 40-foot depth at mean low water, a 2-foot overdepth was allowed and paid for. Usually the contractor



C. & E. M. Photo

Side view of the dredge Crest on the Boston Harbor job.

preferred to dredge to a 43-foot depth, even if he did not get paid for that last foot, rather than be forced to return for redredging to a location that was shy the required depth.

Dredge Crest

In 1926 the Bucyrus Co. of South

Milwaukee, Wis., built the Crest for the Great Lakes Dredge & Dock Co. This dipper-type dredge uses buckets from 10 to 16 yards in size; the 10 and 12-yard buckets work in rock and hard material; the 14-yard bucket, as on this job, is good in clay; while the big

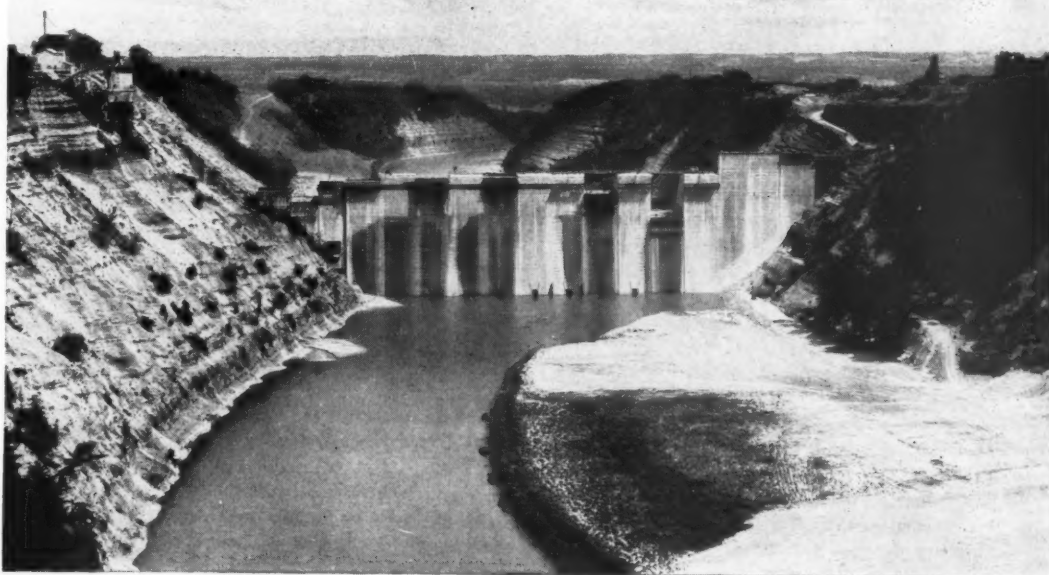
(Continued on next page, col. 3)

GULF PRODUCTS and FINE SERVICE

keep equipment rolling

on Mt. Morris Dam Project

Mt. Morris Dam Builders, Inc., consisting of 5 leading contractors, has just completed the construction of the huge Mt. Morris Dam on the Genesee River near Mt. Morris, N. Y. One of the largest in the East, the new dam will impound the run-off from a watershed of 1077 sq. mi. Major items of work and materials included 670,000 cu. yds. of earth and rock excavation, 767,000 cu. yds. of concrete, 800,000 bbls. of cement, and 1500 tons of reinforcing steel.



THE Mt. Morris Dam is a big construction project. It's the kind of job on which contractors don't take chances with their equipment. They want smooth, dependable operation and the best insurance they can buy against costly mechanical delays.

That's why Mt. Morris Dam Builders, Inc. selected Gulf quality lubricants and fuels—on the basis of experience and reputation. And they have obtained the kind of lubrication and fuel performance required to complete this important project ahead of schedule.

Write, wire or phone your nearest Gulf office today and arrange to use Gulf quality lubricants and fuels on your next job. They are quickly available to you through 1400 warehouses in 31 states from Maine to New Mexico.

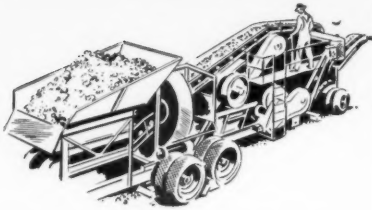


Jobs Done Quicker, Cheaper

Attached to Tractors, Bulldozers, Motor Graders and Scrapers, the Automatic Slope-Meters are in use on the construction of highways, airports, dams and building sites. Slope-Meters are compact, sturdily constructed instruments that will automatically show the operator the exact grade or slope on which he is working.

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Torrington Spherical Roller Bearings are self-aligning. They easily handle the heavy shock loads of rugged construction work.

These heavy-duty bearings are made of the finest materials, to precision tolerances. They are ideal bearings for all types of construction machinery.



THE TORRINGTON COMPANY

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Dipper-Type Dredge Makes Harbor Deeper

(Continued from preceding page)

16-yard bucket is well suited for softer materials like mud, sand and gravel, and cobbles. On some jobs the Crest has dredged in 74 feet of water, using an 8-yard bucket with a 90-foot stick or handle. Either Bucyrus or Amsco buckets are employed, and dipper handles are available in 60, 67, 77, and 90-foot lengths. On the Boston project the 77-foot stick sufficed; it is made of cast steel and was built in two sections.

Weighing 1,059 gross tons, the Crest has a steel hull 167 feet long x 48 feet wide x 14 feet in depth, and has a timber belting around the sides. Above the hull is a wooden deck house, deep red in color with white trim, containing quarters for the crew. A full complement of 41 permits round-the-clock work in three 8-hour shifts. The Crest worked 24 hours a day, six days a week, with the seventh day used for

overhaul and any repairs that were needed.

Looming up at the bow of the dredge is the 70-foot A-frame supporting the 65-foot boom through which the dipper stick slips back and forth. The three spuds are of impressive size, being 51 inches square and 85 feet long, and weighing about 60 tons. The two forward spuds, port and starboard, move in wells at the sides of the hull close to the bow, while the third is a trailing-type spud located in a slot at the center of the stern. All are made of steel; the starboard spud is cast, while the port and stern spuds are fabricated. Other spuds up to 101 feet in length are part of the equipment of the dredge.

Diesel-Electric Power

A transverse bulkhead across the hull of the dredge gives to the engine room at the stern more than half the length of the vessel. Here is the source of the diesel-electric power that runs the Crest. Along each side are the twin Fairbanks-Morse 6-cylinder 720-hp 2-cycle diesel engines, each driving three General Electric generators from a common shaft. The first and also the largest generator behind each engine is a 225-kw unit. These two main generators run a pair of 250-hp motors, coupled together on a main shaft, that operate the bucket hoist on the dipper.

Second in line are 100-kw generators, the one on the port side operating a 100-hp motor for the thrust or crowding action of the dipper stick, while the starboard unit serves the 100-hp swing motor. The last two generators are rated at 75 kw, and supply current for lighting and the various service or auxiliary motors for winches, pumps, etc. The master switchboard is at the forward end of the engine room, along the transverse bulkhead.

In between the main engines is a Fairbanks-Morse 2-cylinder 120-hp 2-cycle diesel standby for use when the dredge is not at work and the big twin diesels are idle. This smaller unit actuates a generator that delivers current for lights and small motors. In addition, for any emergency, there are two small Fairbanks-Morse 7½-hp diesels that would take over if the standby engine failed. They are located on each side of the engine-room companionway. Direct current is used throughout. At the rear of the engine room is a 120-hp oil-burning boiler for heating the dredge.

Operating Gear

Forward of the engine room is the compartment housing the operating gear and a complete machine shop. A Brownhoist overhead crane, moving on rails supported by I-beams on each side, serves both sections of the hull. The machine shop is equipped with lathe, shaper, drill press, emery wheel, and power hacksaw.

Dominating this end of the dredge is the large Bucyrus winding gear, with the two main hoist motors on each side of it to the rear. Forward of that is the swing motor. On the main hoist are two 2⅝-inch cables on a single drum; the forward spuds have double 2-inch cables; the one stern spud has a single 2-inch cable; and the swing cable is 1½ inches in diameter. Cables of 1¾ inches and ⅞ inch are also used. The wire rope was supplied both by American Steel & Wire and by Roebling.

The Crest has tanks of 55,000-gallon capacity for diesel fuel, and in an average month of operation on this job consumed 37,000 gallons of Esso 210 Socony-Vacuum lubricating oil and greases were used, the average monthly requirements being 500 gallons of oil and 500 pounds of grease. A closed system of cooling with fresh water is employed, with the fresh water in turn cooled by sea water through a heat exchanger. For domestic use the dredge

(Continued on next page)

**Let's Call Wire Rope Constructions
by their Right Names!**

This is a message of importance to every user and purchaser of wire rope. It is information that will help eliminate much of the past confusion over wire rope terminology.

How did this confusion arise? Let's illustrate briefly. For years 6 x 19 has been just a name for a variety of six-strand ropes, few of which actually have 19 wires per strand. As an example, our popular 6 x 19 W has always contained 25 wires per strand; the 6 x 19 U, 21 wires per strand. The 6 x 19 Seale, on the other hand, really does have 19 wires in each of its strands. Until recently, the letter or name following the numbers denoted the actual construction; but many users did not know this, and the omission of these symbols occasionally resulted in costly misapplications.

To clarify matters in the various classes of rope, Bethlehem has revised the entire list of misleading designations. For instance, in the

Bethlehem terminology, Type W rope is now designated—accurately—as 6 x 25 W (not 6 x 19); Type Q is 6 x 41 Q (not 6 x 37). This completely accurate terminology applies to each and every rope that Bethlehem makes.

Nothing has been changed but the designation. The ropes are made to the same high standards of Bethlehem quality. *Constructions are the same as in the past.* Only the names, the designations, are different. The numbers now mean what they say.

We earnestly solicit your help in publicizing this information. The transition now under way is one that has long been needed.

**BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.**

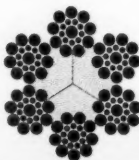
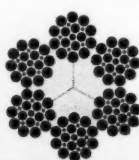
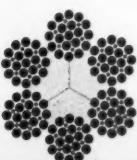
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



6 x 25 Type W

6 x 21 Type U

6 x 19 Seale



Of these three ropes, Seale is the only one with 19 wires a strand. Yet for years all three types have been known as 6 x 19. This is not an isolated case. Similar instances occur in other classifications of rope.

has a 3,000-gallon tank containing fresh water.

Dredging the Bottom

When the dredge is working, all three spuds are down. The Crest on this job dug to the required depth in cuts 35 feet wide and about 15 feet in length before moving ahead. As the bucket is about 25 feet ahead of the hull at the start of a bite, soundings are taken off the bow to check on the work that has just been done. If shoals are discovered, the dredge moves back and removes them before leaving that spot. When going forward, the two forward spuds are raised and the bucket is thrown ahead to pull the dredge along as the stern spud is trailing. With its bucket anchored on the bottom, the dredge can thus move forward or backward or to the sides as needed.

Ranges on shore keep the craft on the proper course. The high towers of the new Mystic River Bridge and landmarks in the Charlestown Navy Yard served as markers for sextant angle



C. & E. M. Photo
William Wilson, Corps of Engineers Inspector, keeps the dredge on the ranges with a sextant angle shot.

shots. Points were lighted for night work.

From a control house forward on the top deck, the operator swings the turntable on which the long boom revolves for placing a bucket of dredged material into the waiting scow. A crane-man down on the turntable in a small deck house trips the bucket and watches carefully the grade being dredged. With an average 9.4 feet mean range of tide at this location in the upper harbor, the dredge had to dig at a maximum depth of 43 plus 9.4 or 52.4 feet when the tide was high.

At the stern of the upper deck is another small house from which one of the mates operates the rear spud as the occasion warrants. All key points on the dredge are hooked up with a Flexifone communication system, and loud speakers are spotted around so that orders can be given to the accompanying dump scows. In addition the dredge is equipped with a Radiomarine ship-to-shore telephone, as are the tugs and towboats.

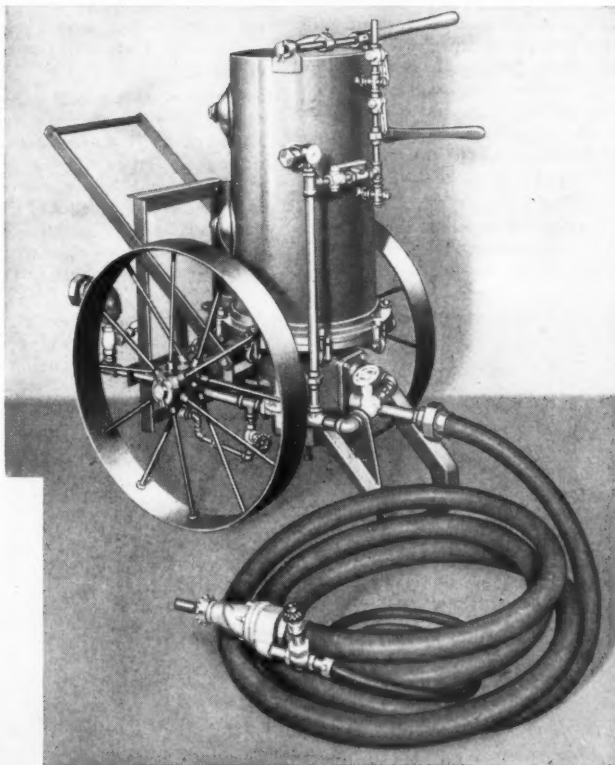
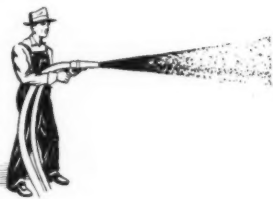
Spoiling the Material

Two bottom-dump steel-hull scows, averaging 1,500 cubic yards a load, moved the dredged material taken from the channel to spoil areas in the harbor. Two such sites had been selected by the Corps of Engineers, and the dumping was under its supervision. One site, known as the Bird Island Flats, was along the west side of Logan

(Concluded on next page)

For Cement Work YOU CAN DO A BETTER JOB WITH A MACRETE Gun

In comparison with hand application on cement work, the MACRETE GUN is not only faster and more economical but gives a higher quality coating. Tensile strength will range from 10% to 200% better than hand work, and compression strength is even more marked—up to 700% greater, and with less voids. Adhesion is increased at least 25%. The MACRETE GUN comes complete with all fittings and accessories—ready to use.



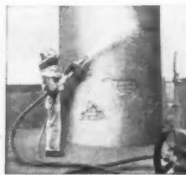
The MACRETE GUN is easy to clean and to keep clean. The unit opens up and tilts back to enable the operator to remove mixture, and prevent hardening or clogging.



The Macrete Gun provides a quick and effective method for re-surfacing old and deteriorated walls.

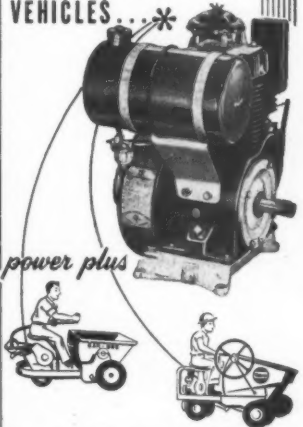


Ideal for repairing and restoring piers, bridges, etc.



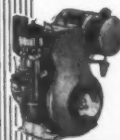
The more difficult the job the easier it is to do with a MACRETE GUN.

GLADDEN ENGINES NOW OPERATING OVER 3000 MATERIAL HANDLING VEHICLES...

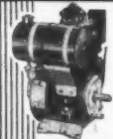


AN OUTSTANDING RECORD OF TROUBLE-FREE PERFORMANCE

"We are using Gladden engines exclusively on our material handling units because of their universally accepted dependability and powerful performance," says the Vice-President of one of the leading manufacturers of material handling units.



MODEL 75-7 H.P.



MODEL 50-5 H.P.



MODEL 40-4 H.P.

Strong, reliable and inexpensive to operate, GLADDEN'S series of single cylinder, air-cooled, pretested engines find real usefulness in every construction application.

FEATURES OF DESIGN

- Timken Main Bearings
- Automatic Type Connecting Rod Bearing Inserts (Models 50 & 75)
- Mechanite Cylinder Castings
- Pressure Cast Aluminum Head
- Oil Bath Air Cleaner as Standard Equipment (Models 50 & 75—Optional 40)
- Generous Fin Area Insures Maximum Cooling

GLADDEN ENGINEERS WILL ADAPT THESE ENGINES TO SPECIAL INSTALLATIONS OR REQUIREMENTS UPON REQUEST...

For further information write

GLADDEN PRODUCTS CORPORATION

NOW IN THE 33rd YEAR OF ENGINE BUILDING
635, Dept. 100, West Colorado Boulevard
Glendale 4, California

KEEP INFORMED—

For further information and literature on products described in this issue, turn to page 16 for the Request Card. Our Reader Service Department will be glad to help you.

Contractors and Engineers Monthly
470 Fourth Ave., New York 16, N.Y.



The MACLEOD Company

2240 BOGEN ST. CINCINNATI 22, OHIO ESTABLISHED 1897

For prices and descriptive literature write

Dipper-Type Dredge Makes Harbor Deeper

(Continued from preceding page)

Airport where 32 feet of water was being filled in to a 15-foot depth. Average one-way haul from the project to this dump was one mile, and the round trip with a scow took about an hour.

Winthrop dump, the other spoil area, was off the southeast end of the airport, and 5 miles from the job site. A round trip to this point was more than 2½ hours in time. The same grade was held, meaning that dumping was not allowed when the depth of water was 15 feet or less. While one scow was being loaded, the other was on its way to be dumped. Average time required to load one of these scows was 3½ hours.

Scows were towed by the Charles E. Trout, an 80-foot tug powered by a GM 750-hp diesel engine. The Dark, a larger tug, towed the Crest to this job in Boston Harbor. Personnel and supplies were moved between dredge and dock by the A. H. Downs, a 53-foot launch driven by a Wolverine H. D. 100-hp diesel engine.

Personnel

As a section of the channel, 650 feet wide x 40 feet in depth, was completed, a final survey was made on which payment to the contractor was based. The Crest averaged 9,000 cubic yards of material in a 24-hour day. Its complement of 41 included the captain, an assistant captain, chief engineer, 3 assistant engineers, 3 operators, 3 cranesmen, 8 oilers, 3 mates, 9 deck hands, 4 scow men, 3 cooks, and 2 mess boys.

The Charles E. Trout for its round-the-clock work used a crew of 17 that took in 3 captains, 3 chief engineers, 3 oilers, 6 deck hands, a cook, and mess boy. On the A. H. Downs, the crew totaled 6—a captain and deck hand for each of the three shifts.

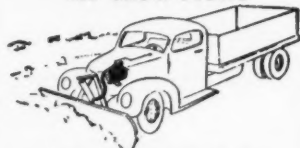
In an average month the Trout required 13,000 gallons of diesel fuel, 400 gallons of lubricating oil, and 35 pounds of grease. The smaller A. H. Downs used up in that same time 1,500 gallons of diesel fuel, 52 gallons of lubricating oil, and 25 pounds of grease.

For the Great Lakes Dredge & Dock Co., Captain Frank Hunt is Master of the Crest and Walter Pike is the Chief Engineer.

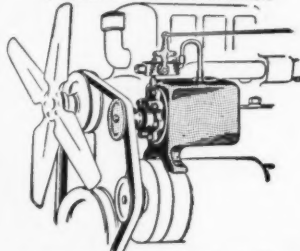
William Wilson was Inspector on the improvement dredging in Boston Harbor for the U. S. Army Corps of Engineers. The New England Division of the Corps of Engineers is headed by Col. H. J. Woodbury, Division Engineer.

Remember—Safety Is No Accident!

POWER HYDRAULICS for Snow Plows



• Clutch Models Now Available



• THOUSANDS IN USE • FIT ALL TRUCKS
• FAN BELT OR ELECTRICALLY DRIVEN MODELS

• Write Hydraulic Division

MONARCH ROAD MACH. CO.
323 N. Front Ave., Grand Rapids 4, Michigan

Glare-Reducing Glass For a Line of Trucks

Green-tinted glass for reducing glare and heat will be made available in all International truck cabs and panel trucks. Solex Duplate will be standard equipment on the new short-dimension 102 Roadliner models, and will be optional at extra cost in all other models. The glass is credited with absorbing much of the sun's heat and reducing eyestrain without sacrificing the light-transmission characteristics of high-quality glass.

Further information may be secured from International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. Or use the Request Card at page 16. Circle No. 401.

Bulletin on 4-Rope Buckets

Users of overhead or bridge-type cranes with 4-rope bucket trolleys will be interested in a 44-page bulletin issued by Blaw-Knox Co., P. O. Box 1198,

Pittsburgh 30, Pa. It lists ten items of information to include when requesting prices and specifications of buckets.

There are numerous illustrations of bulk-material handling, with performance data and comparisons of cargo dispatch and discharging vessels, barges, and railroad cars. There is also infor-

mation on 4-rope bucket types, reeving, arrangement of cables for various types of cranes, and cable life as influenced by sheave diameter.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 16. Circle No. 543.

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Long Island City 1, N. Y.
37-35 10th St.
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Chicago, Illinois
2608 W. 111th St.
Hilltop 5-1545

Runs two wagon drills, has air to spare...with help of TIMKEN® bearings

YOU can keep two heavy wagon drills going full blast with this Le Roi 600D compressor and still have enough air capacity left over for secondary drilling. It gets its large capacity from a two-stage, semi-radial compressing unit. And it gets much of its ruggedness and dependability from the Timken® tapered roller bearings on its crankshaft and in its wheels.

Because of tapered construction, Timken bearings take radial and thrust loads in any combination. They

hold the compressor crankshaft in accurate alignment, reducing wear on related parts. Compressor is ready to go when it's needed. Repairs are minimized.

Wheels roll easily on Timken bearings and compressor can be towed at high speeds. That's because the true rolling motion of Timken bearings plus the smooth surface finish of their rollers and races practically eliminate friction. And on rough terrain, heavy shock loads are carried with ease because line contact between rollers

and races gives Timken bearings load carrying capacity to spare.

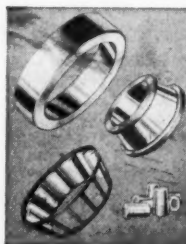
No other bearing can give you all the advantages you get with Timken bearings. Make sure you have them in the equipment you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best.



How **LEROI COMPANY** mounts the crankshaft of its 600D compressor on Timken bearings to insure dependability and long life.

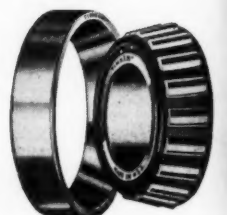


DESIGN LEADERSHIP

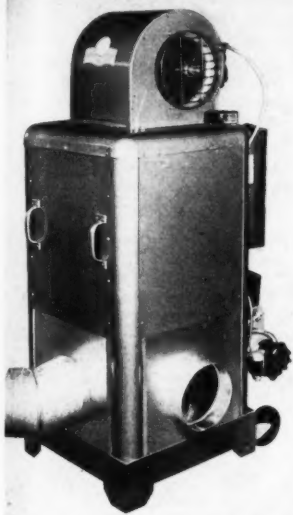
The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN
TAPERED ROLLER BEARINGS



NOT JUST A BALL ● NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION



Here is the Fageol Model PW-189 heater with its special duct-adaptor side panels made of heavy sheet steel.

A Panel Attachment For Space Heaters

Production of special side panels for the Model PW-189 heater to permit its operation with warm-air ducts is announced by Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich.

The adapter panels are made of heavy sheet steel with flanged openings for duct attachment and can be installed in a few moments, the manufacturer claims. Addition of the warm-air ducts permits the use of the heat machines where intense heat must be concentrated on one spot or heat transferred for substantial distances.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 453.

Concrete Gun Machine

A concrete gun and sandblasting machine is available from Air Placement Equipment Co., 1009 W. 24th St., Kansas City, Mo. The Model No. 750 Bondactor has dual compartments and is completely pressurized for continuous operation. Used wherever gunned or air-placed concrete is needed, it will handle $\frac{1}{2}$ to $\frac{3}{4}$ yard or 3 to $4\frac{1}{2}$ sack batches of aggregate per hour.

The unit requires dry materials, because it has no air-motor-driven agitating and feeding mechanism. The package unit includes all equipment, accessories, and hose items for operation with an 80 or 105-cfm air compressor. The standard A-904 gun is supplied with the machine.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 542.



For use wherever gunned or air-placed concrete is needed, the Model No. 750 Bondactor package unit includes all equipment, accessories and hose items for operation with an 80 or 105-cfm air compressor.

Handbook of Fundamentals

The second edition of the widely used "Handbook of Engineering Fundamentals" by O. W. Eshbach has been published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. The book contains 1,322 pages and includes 819 illustrations.

The first edition was prepared to embody in a single volume those fundamental laws and theories of science basic to engineering practice. The new edition has not changed the scope or objective of the first, but has made many changes in each section.

The engineering tables were enlarged to include structural sizes for aluminum and data on tangents and offsets. In the mathematical section, greater stress has been placed on statistics, vector analysis, and determinants. The subject of electricity has been completely rewritten, the theory being presented in the MKS system of units.

The second edition is 240 pages

larger than the first edition and has a new section on aerodynamics. It has a semiflexible binding and is priced at \$10.00.

Data on Portable Vibrator

A wheelbarrow-type generator plant with receptacles for two vibrators and two 600-watt lights is covered by Catalog No. 992 distributed by Master Vi-

brator Co., 108 Davis Ave., Dayton 1, Ohio.

The Master Champ weighs 172 pounds and powers two $2\frac{1}{4}$ x 18-inch vibrators at 10,300 rpm. The 4.4-hp Wisconsin engine operates at 3,200 rpm. Conductor cables are furnished in 50, 100, and 150-foot lengths.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 430.

CAMPBELL ALL-WEATHER DETACHABLE CAB

Special Features:

Protection for the operator in all kinds of weather — Maximum visibility — Quick installation. Complete operator comfort and roominess — Unobstructed entry to the operator's compartment.

Cabs of this design are available for most types and models of wheel and crawler tractors. Illustrated literature with specifications is available.

Campbell Detachable Cab Co.
122 Kent Avenue, Wauconda, Illinois



Hough Model HM "Payload" tractor with Campbell Detachable Cab.



Here's your **SUPER Breaker!**

JOY

K-89

paving breaker

For fast demolition of those extra tough-and-heavy reinforced concrete sections—for driving heavy sheet piling with a driving shoe—for all your really rugged jobs . . . the K-89 Super Heavyweight gets the work done.

A "Big Brother" to the popular line of "K" type SILVER STREAK Paving Breakers, this NEW 90 lb., K-89 really packs a wallop. Although it strikes a powerful blow to do the heavy work, a cushion of air absorbs the blow and eliminates jarring and vibration—yet the full force of the blow is delivered direct to the steel or piling. The two sturdy "U" type side rods minimize side rod breakage and allow a comparatively smooth pocket or working surface for the operator's leg.

Owners of Joy K-type Paving Breakers like the interchangeability of many parts which keeps parts stocks at a minimum . . . and like all "Silver Streak" breakers the Super Heavyweight K-89 is CADMIUM PLATED inside and out with that silver-like covering which prevents rusting, eliminates scoring of piston and cylinder, and aids lubrication. • Write today or contact your nearest Joy office or distributor for complete details about this NEW heavy-duty breaker.

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JOY
DUAL VALVE
that makes
air do more work!

JOY PRODUCTS

Portable and Stationary Compressors
Rock Drills • Wagon Drills • Core Drills
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other Pneumatic Tools

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OVER 100 YEARS OF ENGINEERING LEADERSHIP

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IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO





A workman puts the finishing touches to a 3,500-square-foot false ceiling made by placing planks on top of 25 Waco steel scaffolding towers. This false ceiling enabled nine men to work simultaneously, plastering the ceiling of a church gymnasium.

False Ceiling Aids High Plastering Job

The use of a false ceiling supported on sectional steel scaffolding made it possible for nine plasterers to work at the same time on the job of plastering a 50 x 70-foot ceiling (19 feet 3 inches high) for the gymnasium of the new Evangelical Reformed Church in St. Paul, Minn.

The contractor, Poppenberger & Sons, St. Paul, used Waco scaffolding. In six hours two men put up 25 towers—each consisting of two 4-foot 6-inch end frames with pivoted cross braces topped with a 4-foot frame—then covered the scaffolding with 2 x 6-inch planking. This gave a comfortable ceiling height of 6 feet 1 inch for the plasterers to work on. The whole plastering job took only seven working days.

Color-Code Hose Line

Consolidation of its molded-hose line from 18 different types into 5 basic types is announced by Thermoid Co., 400 Whitehead Road, Trenton, N. J. Features of the new line include rayon braids of high tensile strength instead of cotton, and new tubes of both natural and synthetic rubber. Each type has a distinctive cover color, coded according to applications, to prevent confusion in stocking and use.

The hose handles pressures from 125 to 800 psi. Various types carry air, water, oil, gasoline, butane, propane,

and steam. They may also be used for welding, agricultural spraying, and heaters.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 434.

Data on Underwater Pumps

A catalog on a line of underwater pumps is issued by Lancaster Pump & Mfg. Co., Inc., Manheim Pike, Lancaster, Pa. It illustrates the Type D which comes in a number of sizes and has either single or 3-phase motors ranging from 0.8 to 35 hp. Sizes up to 250 hp are available on special order.

The multistage centrifugal pump above the motor has balanced bronze impellers and guide channels. The pump body is of cast iron. Type D submersibles are water-filled, water-cooled, and water-lubricated. Copper windings covered with waterproof and non-aging polyethylene eliminate the sealing tube

usually needed to keep water from entering the motor stator.

The catalog explains that the pumps are noiseless, require no pump house, are always primed, and require no lubrication. Complete performance curves are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 440.

Macwhyte Elects Wilder

As a result of the death of Jassel S. Whyte, President of Macwhyte Co., Kenosha, Wis., wire-rope manufacturer, a special meeting of the Board of Directors was held to elect a successor. The post went to George C. Wilder, formerly Vice President and Assistant General Manager, who is also named Director to fill the unexpired term of the late Mr. Whyte.

Mr. Wilder joined Macwhyte in 1930 and has served in various capacities since that time.



HERE'S WHY:

You get more work out of a bucket that holds steady and is back in position quicker for another bite. Rud-O-Matic Taglines have ample coil spring power to provide constant tension for steadying the largest clamshell buckets at any angle of the boom.

You get lower costs through faster operation coupled with Rud-O-Matic's trouble-free service. No pins, weights or tracks to get out of whack, only the simplest of working parts. Compact—and easy to install on any crane.

Rud-O-Matic Taglines are made in 8 models for all bucket sizes, and are supplied with cable and installation equipment.

Immediate delivery from your nearby equipment dealer—or send coupon below for details.



I'd like more information on Rud-O-Matic Taglines. Send literature and complete details.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

McCAFFREY-RUDDOCK
Tagline
CORPORATION

2131 East 25th Street • Los Angeles 58, California

"BIG BITE" THE DIGGER FOR BIG HOLES



Here's 40-foot hole depth with 72" diameter... with speed and excellent performance. Positive digging all types earth.

Hydraulic raising, side leveling and 7½' transverse bit travel. Rugged mechanical finger-tip control. Uses full "power crowd" with cable pull-down. Variable bit speed, hi-speed dirt throw-off and reverse, driven through Twin Disc clutches off roller chain. All totally enclosed. Timken roller and RBC needle bearing equipped.

Manufactured by
HUGH B. WILLIAMS MFG. COMPANY
2946 Oak Lane Dallas, Texas
Distributed by **JOSLYN SOUTHWEST COMPANY**, Dallas, Texas

THURMAN Heavy Duty PIT SCALE

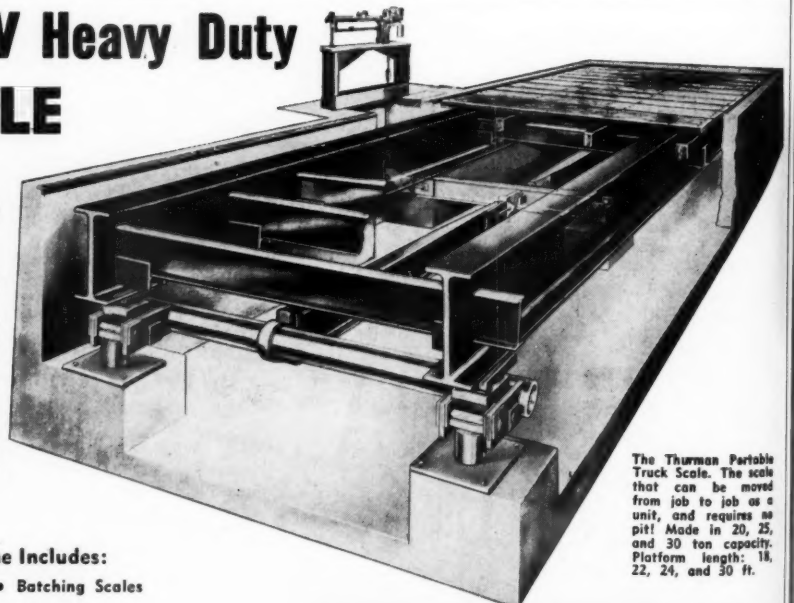
Platforms:
18 to 50 Feet

Capacities:
20 to 50 Ton

Built to rigid U. S. Bureau of Standards specifications. Pivots and bearings of fine heat-treated steel, electroplated to resist corrosion. Castings and forgings are over-size for safety. I-beams and cross members are extra heavy structural steel. Pit preparation blue prints are furnished.

The Thurman Line Includes:

- Portable Motor Truck Scales
- Batching Scales
- Pitless Scales
- Liquid Weighing Scales
- Wheelbarrow Scales
- Warehouse Scales
- This and other weighing equipment in sizes to fill your requirements.



The Thurman Portable Truck Scale. The scale that can be moved from job to job as a unit, and requires no pit! Made in 20, 25, and 30 ton capacity. Platform length: 18, 22, 24, and 30 ft.

THURMAN MACHINE CO.

Scale Division

Established 1918

156 North Fifth Street

Columbus 15, Ohio

City Street Rebuilt From Top to Bottom

Contractor Removes Old Pavement, Regrades, and Widens
To Accommodate Six Lanes of PC Concrete

• OKLAHOMA CITY is going to have some first-class main thoroughfares, judging by the recently completed 13th and Lottie Street improvement. Boecking Construction Co. of Oklahoma City held the \$516,000 contract.

The OK State is booming and with it its capital city. Population is increasing. Industry is moving into the area to take advantage of the climate and labor market. The city government recognized the demand for more and better facilities and in 1950 voted \$36,000,000 for public works. The 13th and Lottie Street project represents an important part of the \$6,000,000 bond issue for street improvement.

The improvement project covers two streets—northeast 13th Street and Lottie—which intersect at a right angle but constitute a main southwest route into the downtown area. Indirectly they tie in with U. S. 62, 77, and 270, and Oklahoma Route 3. They also serve Oklahoma's principal medical center which will include a new 500-bed VA hospital now under construction.

Alternate Bids

To obtain the best bid possible, the consultants designed alternates of hot-mix and portland-cement concrete for the pavement and for some details. Boecking got the contract, on its \$516,000 low bid, for portland-cement-concrete paving. Unit bid on the 7-inch P-C concrete paving was \$3.15 per square yard.

The project is 11,000 feet long. Quantities include:

Paving removed	58,740 sq. yds.
Sidewalk removed	3,414 sq. yds.
Excavation	32,000 cu. yds.
Subbase, 8-inch	84,360 cu. yds.
Concrete paving, 7-inch	76,000 sq. yds.
Concrete sidewalks, 4-inch	3,674 sq. yds.
Concrete driveways, 6-inch	2,275 sq. yds.
Integral curbs	39,425 lin. ft.

Paving Spex

The new roadway has a right-of-way 90 feet wide. A raised median 4 to 14 feet wide divides the opposing traffic lanes; six-foot widths and over are sodded with Bermuda grass—narrower widths are paved with concrete. On each side of the median there are two 11-foot driving lanes and one 8-foot parking lane.

Toler, Jones & Toler, Consulting Engineer, Oklahoma City, was the project designer. The pavement is 7 inches of 3,500-pound unreinforced concrete. The foundation consists of an 8-inch selected-soil subbase and a 6-inch compacted subgrade extending 12 inches beyond the curb line. Both have densities of 95 per cent, or better, modified Proctor. The driving lanes slope $\frac{1}{8}$ inch to the foot away from the median. The slope of the parking lane is a little steeper, $\frac{1}{4}$ inch to the foot. Integral curbs are

(Continued on next page)



C. & E. M. Photo

Truck mixers chute concrete in front of a Jaeger-Lakewood finisher on the Boecking street-improvement job in Oklahoma City.



IT'S A SIMPLE STEP



It is no trouble at all to install Armco FLEX-BEAM Guardrail. The job moves along quickly with a small, unskilled crew and a few simple tools.

All you need are posts, rails and bolts. Individual FLEX-BEAM sections are securely spliced with seven heat-treated bolts, one of which holds the rail to the post. No deadmen, turnbuckles, springs or anchorages are required. Jobs are done fast and at low cost.

Installing FLEX-BEAM on curves is equally simple. There is no stretching so posts stay in perfect alignment. Sections are shop-curved to fit any radius from 20 to 150 feet. Larger curves can be made from straight sections.

FLEX-BEAM Guardrail is used for protecting motorists on expressways as well as low cost roads. Its high visibility warns of danger and its strong, flexible beam action absorbs and cushions impact. Colliding cars are guided along the rail until the driver can regain control. Dangerous pocketing is eliminated.

Finish off that next highway job with easy-to-install FLEX-BEAM Guardrail. Write for complete information and also ask about FLEX-BEAM Bridge Rail, Armco Drainage & Metal Products, Inc., 3862 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

FLEX-BEAM GUARDRAIL



The Quinn Standard
FOR CONCRETE PIPE

The Quinn Standard is known as the best in the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

Also manufacturers

QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1645-1231 BOONE IA

City Street Rebuilt From Top to Bottom

(Continued from preceding page)

6 inches high above the pavement, 6 inches wide at the top, and 8 inches wide at the base. The edges have a

2-inch radius.

The longitudinal dummy joints are Kapco tongue-and-groove, premolded, deformed, bituminous, center strips with 1/2-inch-round 30-inch-long deformed bars spaced 30 inches on centers. A 1/2-inch-round longitudinal bar is placed directly under the curbs for

edge reinforcement. Contraction joints occur every 20 feet; expansion joints every 100 feet. Star Lug load-transfer units nailed to redwood board form the joints. They are set 15 inches apart along a 3/4 x 1 1/2-inch board at the contraction joints and 19 inches apart on a 3/4 x 5 1/2-inch board at the expansion joints. The expansion-joint slot is filled with Careylastic sealing compound.

New sidewalks were also included in the contract. They are 4-inch concrete, 5 feet wide, with a 1/4 to 12-inch slope toward the gutter. Joints are cut every 5 feet. Every 50 feet a 1/2 to 3 1/2-inch Kapco board is installed as an expansion joint. The slot is filled with Careylastic. New 6-inch concrete driveways were taken in as far as the sidewalks.

Other work included replacement or installation of new sewers, water lines, and signal-light conduits. Private utility lines were replaced or moved by the companies' crews. All trenches on this work were backfilled with an A-2 soil compacted to 95 per cent modified Proctor.

Fast Break-Out

Boecking crews started to work in August, 1951. The first job was breaking out the 30-year-old patched and repatched pavement. It was an asphaltic concrete, 6 to 9 inches thick, cracked and full of chuck holes. The first thing they did was to make neat slices at all the intersections and drives so the break-out would be smooth and even at the edges. A new Model TL-A Tri-Line pavement cutter with a 14-inch diamond-tipped blade did the job. There was about 4,000 feet of this cutting—enough to pay for the cutter on this job alone.

At first the contractor tried a self-propelled breaker to smash up the old pavement. It didn't do the job fast enough so he brought in a 3/4-yard Link-Belt crane and let her drop a 2,200-pound ball around a bit. That did the trick and gave a fast break-out. One thudding kaplop and the cracks streaked out over a 4-foot radius. The crane moved on up the street making

(Continued on next page)



ONE-PIECE GEAR CASE



FULL VISION CAB



TWIN HOOK-ROLLERS



AUTOMATIC TRACTION BRAKES



STRAIGHT IN LINE MOUNTING

10 Reasons Why UNIT is a BETTER MACHINE



DISC CLUTCHES



DROP-FORGED PARTS



INVOLUTE SPLINES



HEAT TREATING



WORM DRIVE

UNIT is the ONLY machine on the market with all these time-tested, outstanding features . . . and every one is backed by more than a quarter century of engineering skill and craftsmanship.

Compare UNIT, part for part, feature for feature, with any other crane or shovel, and you will realize why UNIT leads the field in excavating and material handling equipment.

Why not investigate what UNIT can do for you? Get the complete story — write today for free booklet "10 Reasons Why UNIT Is A Better Machine."

UNIT CRANE & SHOVEL CORP.
6309 W. BURNHAM STREET
MILWAUKEE 14, WIS., U. S. A.



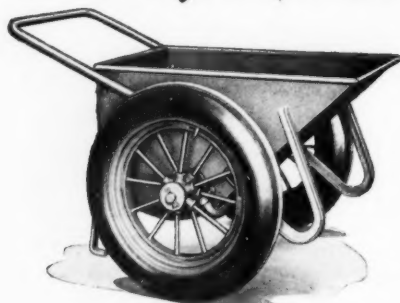
UNIT

SHOVELS • DRAGLINES • CLAMSHells • CRANES • TRENCHERS • MAGNETS

Available in Crawler and Mobile Models . . . 1/2 and 3/4 yard Excavators . . . Cranes up to 20 tons lifting capacities . . . Fully convertible to all attachments.

CONCRETE CARTS EASY to WHEEL—EASY to DUMP

Perfectly Balanced!



No. 626-PR Sterling Cart with dumping rockers and 4.00 x 18 pneumatic tires.

Just the cart you need for hauling concrete or other materials. Takes a full batch from small mixers without danger of spilling. 6 cubic foot capacity, water full. Sterling quality construction. Tray made of 14 gauge steel with continuous 1/2" diameter butt-welded rod to reinforce top edge. 1 1/4" T-Iron rockers facilitate dumping. Roller bearings standard equipment. Choice of 30" dia. steel wheels or pneumatics. Write for Sterling Cart Catalog No. 63.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Sterling
WHEELBARROWS

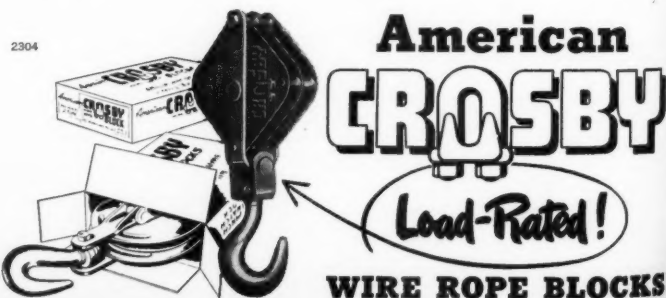
Look for this Mark of
STERLING Quality

What's the capacity of this block?



If you don't know.. *don't use it!*

There's no place for guess-work in wire-rope lifting. Imagine the damage and expense involved if a hook straightened or a pin sheared, and this car suddenly dropped! And there's no guess-work to it when you're using American CROSBY Wire Rope blocks. Each American CROSBY block is LOAD-RATED—safe working capacity embossed in the side plate. That means lifetime protection . . . assurance of terrific strength throughout the block . . . extra-thick side plates, over-size pins and axles, sturdy, drop-forged hooks and heavy stiffening straps. Buy American CROSBY Wire Rope blocks, in sealed cartons, from your distributor or supply house. Made by the makers of genuine CROSBY Clips . . . American Hoist and Derrick Company, St. Paul 1, Minnesota.



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C. & E. M. Photo

Three stages of sewer construction: In the far background a Link-Belt backhoe excavates; in the center an A-frame truck-mounted lift lowers the pipe into the trench; and at right a truck dumps selected backfill.

checkerboard holes 4 feet apart, as a D7 dozer moved in behind to lift the pieces off the subgrade. A D6-mounted Traxcavator scooped up the piles the dozer had made and loaded them into 4-yard dumps. Spoil areas were just around the corner, so to speak—nearby eroded drainage ditches. C&M Construction Co., Oklahoma City, had the subcontract for the removal of the broken pavement, and for the grading which followed.

Grading and trenching work moved along at about the same pace. There was quite a bit to the trenching and pipeline work. The contract called for a new storm sewer; lowering a 6-inch water main; replacement of all house service lines; and building manholes and catch basins.

A small tractor-mounted ditcher opened up cuts for the service lines, while a Cleveland bucket-wheel trencher and a Link-Belt backhoe took care of the bigger cuts. The buckets on the Cleveland were 18 inches, but with side cutters they chewed out a 22-inch-wide trench. The backhoe was a ¼-yard.

Pipe was set with an A-frame on the tail of a 2½-ton Dodge. A Tulsa truck winch provided the pulling power. A simple pipe clamp was used since none of the sections were very big. The inspectors kept the invert grade to a fraction of an inch. When it came to backfill, nothing but the best was called for—a Type A-2 (AASHTO) soil compacted in 6-inch lifts to 95 per cent modified Proctor, as a minimum. A couple of Ingersoll-Rand 34 pneumatic tampers powered by an I-R 105-cfm Mobil-Air compressor did the job in some areas, while a mobile Hydra-Hammer did it in others.

Zero Tolerance

Two Caterpillar dozers meanwhile worked on the grading. A D4 and a D6-mounted Traxcavator picked up the excess material and loaded it into dump trucks. When the roadway was brought to the proper elevation, scarifiers on a Galion grader and on an Adams ripped open 6 inches of the subgrade for re-processing. Then they lowered their blades, swept the loose soil into wind-

rows, and passed it back over the roadway in 2-inch lifts.

Two 2-section Tampo sheepfoot rollers worked over each lift. The D4 Cat pullers helped to tighten the surface but Boecking also used a Tampo rubber-tire roller pulled by an International-Harvester wheel tractor. Very little water had to be added to bring the soil to optimum moisture content. Too much water was usually the problem. After a heavy winter rain, Boecking just had to wait it out. Now and then a foot or two of unsuitable subgrade material had to be taken out completely.

Finished subgrade sections that didn't meet the 95 per cent modified Proctor densities were ripped out and redone. That included the 94.8 ones, too.

The subbase was processed the same way. The contractor brought a selected material for the base from a pit about 20 miles away. The spex said the material couldn't be blended on the job, so Boecking had to find soil that would test out in pit-run condition. This soil



C. & E. M. Photo

About 30 to 40 feet ahead of the finisher a workman sets the longitudinal dummy joint.

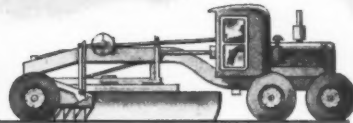
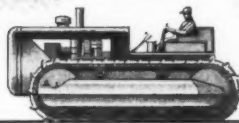
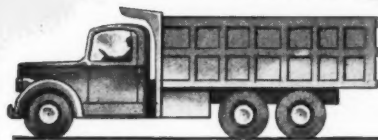
took a bit more water and Boecking used the rubber-tire roller again.

A small Trojan did the final grading. Shop-made fine-graders, drawn by a geared-down I-H wheel tractor, rode the forms to put in the finishing touches (Continued on next page)

STOP

Clutch Trouble

...with
**VELVETOUCH
MATCHED FACING
SETS**



Heavy duty hauling and earthmoving units stay on the job longer when you install Velvetouch Matched Facing Sets. Because Velvetouch clutch plate combinations give you four friction surfaces instead of the conventional two! You get extra clutch capacity . . . extra hours of service . . . extra freedom from adjustment and repair. And with Velvetouch, you can salvage worn and heat checked flywheels and pressure plates for additional savings! See your jobber, our nearest branch . . . or write The S. K. Wellman Company, 1374 East 51st Street, Cleveland 3, Ohio.



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RICE

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PORTLAND—636 N. W. 10th
Ave., Portland 9, Oregon

WASHINGTON OFFICE—
1101 Vermont Ave. N. W.,
Washington 5, D. C.

DALLAS—3407 Main Street,
Dallas 1, Texas

SAN FRANCISCO—424 Bryant
Street, San Francisco 7, Calif.

City Street Rebuilt From Top to Bottom

(Continued from preceding page)

on the surface.

The forms were Metaform and Heltzel steel sections pinned by $\frac{7}{8}$ -inch "sucker rods" 26 to 32 inches long. Boecking kept the forms 600 to 700 feet ahead of the paving and set them to 0.02 inch. A Hudson sprayer coated the forms with a mixture of used oil and diesel fuel.

Five Hundred Feet Per Day

The contractor worked the 11,000-foot project in four sections so as not to tie up traffic any more than necessary. High-early-strength cement was used at intersections for the same reason. In each of the four sections the paving lineup moved down one 8-foot parking lane, then down the adjacent 22-foot driving lane, and then back up the other parking and driving lane in that order.



C. & E. M. Photo

Hand-concreting the 8-foot parking lanes. Contractor-designed form clamps are in the foreground, a contractor-designed vibrating screed is in the background. The truck mixer is a $\frac{1}{2}$ -yard Jaeger mounted on a K-11 International.



in WIRE ROPE, too It's all in the RIGHT KIND of Muscle

The powerful, rugged muscles of a charging rhino enable him to propel his tremendous bulk and weight at truly remarkable speed. Nature designed them well for the purpose they have to serve.

In wire rope, too, the right kind of muscle is vitally important... because different types of jobs present different types of destructive forces. Bending fatigue! Shock stress! Abrasion! Load strain! Each demands wire rope that best combines the required resistance characteristics.

Wickwire Rope gives you the benefit of long experience and specialized know-how which assures you of exactly the right kind of rope your particular job demands.

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LOOK FOR
THE YELLOW TRIANGLE
ON THE REEL

WICKWIRE ROPE



PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

A GMC truck mounting a 1,000-gallon tank supplied water to wet the sub-base. A side-mounted 2-inch Jaeger pump provided the pressure for delivery through a 10-foot spraybar.

Concrete for the parking lanes was chuted from transit mixers driving on the base of the 22-foot lane. Because of the unequal heights of the forms—a 13-inch curb form and a 7-inch inside form—the contractor's shop mechanics made a special vibrating screed. It consisted of a roller-mounted H-beam with the top flange replaced by a $1\frac{1}{2}$ -inch pipe carrying a Master vibrating head. A workman at each side provided the "motive" power.

The Dolese Co. supplied the concrete in $\frac{1}{2}$ -yard Jaeger transit mixers mounted on International K-11 trucks. On the 22-foot lanes, the trucks backed up between the forms to chute their loads in front of the finisher. For this reason the longitudinal dummy joint was set out only 30 to 40 feet ahead of the finisher, and load-transfer assemblies for the joints were set just ahead of the concrete placement. The redwood strips were soaked for 24 hours to give the wood a full swell before it went into the concrete and to reduce the crushing effect when the concrete expanded. Two trucks were usually delivering concrete at all times.

The Jaeger-Lakewood Type H finisher used has a double-tube vibrator with Jackson vibrating heads, and a double-plate screed. The inside-edge rollers rode a 9-inch form; the outside rubber-covered rollers rode on the previously placed parking lane. The screeds on the finisher were offset 2 inches on the inner side to provide a perfectly level 7-inch course.

On one section of the paving there were three curves—each with a radius of about 90 feet. For these, Boecking took off the rear flange wheel of the finisher and put on a wide flat wheel in its place. This kept the machine on grade even though guiding was a little more difficult.

One other problem was settling of the form section under the finisher after a period of heavy rain. The machine was moved along on the forms about 20 feet ahead of the paving each night so that the hand-finishing of the day's pour could be completed. Rain sometimes held up the next pour for a week. The combination of water on the subbase and the 8-ton weight of the machine would push the form down a bit. This

(Concluded on next page)



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Hammond, Ind. Houston, Tex. Jacksonville, Fla.

meant it had to be checked—and usually raised—before the new pour could begin.

Sisalcraft and straw provided adequate protection during cold spells. The Sisalcraft was also used as a cover for new pours when rain seemed imminent.

The paving moved along at 500 to 600 feet per day. The Jaeger-Lakewood finisher on the 22-foot lanes easily matched the hand work on the 8-foot lanes.

Workmen placed the wooden curb forms right behind the finisher. The back form was set on the pavement and held by 1/2-inch rods driven into the ground. The battered front form was laid against fiberboard or steel-plate wedges between the two forms and brought in tight by a shop-made form clamp. The clamp was just a 1/2-inch rod welded to form an inverted U with one side vertical and the other battered. The base of the U had a double bar for easier handling. Concrete for the curb was shoveled into a couple of Jackmanco wheelbarrows from the pile in front of the finishers and brought over to the forms.

Concrete finishers went over the new concrete with a wood float and canvas belt. A Hunt Process membrane cure was sprayed over the finished pavement. Forms were pulled the following day and the section was opened to traffic about 14 days later. Intersections were opened as soon as the test beams showed a 6,000-psi tensile strength.

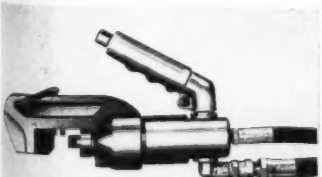
Concrete on the job was a 3,500-pound design, but cylinders broke well over that—near 5,000. The mix was six bags to the yard with 5 1/2 gallons of water per sack. Weights per yard were 2,017 pounds of coarse aggregate, 1,250 pounds of fine aggregate, 541 pounds of cement, and 34.3 gallons of water. The Dolese Co. concrete plant was so close to the job that batches were held to 4 yards to give sufficient time for mixing. Standard Testing & Engineering Co., Oklahoma City, took samples of the concrete once a day. They filled four 6 x 6 x 24-inch "beam" boxes and two 6 x 12-inch cylinders right from the concrete on the subgrade in front of the finisher. They also took a slump test. Beams were testing at about 790 psi, tensile; cylinders at 4,200 to 5,400 psi, compression. Slump was averaging 2 1/2 inches.

Personnel

Boecking Construction Co. had about 50 men on the job—working a single shift. Ed Boecking, partner of the firm, headed up the contractor's forces on this project. Ernie Walling was General Superintendent. The city was represented by Toler, Jones & Toler. Earl Tucker was the Resident Engineer.

High-Speed Cutter

A unit that will cut steel rod up to 1/2 inch is announced by Manco Mfg. Co., Bradley, Ill. The complete cutting cycle of the Model 200-E Guillotine takes one-fourth second. A press of the thumb-button mounted on the handle grip makes the cut. The unit exerts up to 20 tons of thrust from a portable hydraulic pump powered by a 2-hp electric motor connected to a 25-foot hydraulic hose. Blades are easily removed for sharpening. The cutter is also adaptable to high-speed riveting, punching, and swedging operations. Model 200-E is available with hot-cut-



The Manco 200-E Guillotine cuts steel rod up to 1/2 inch. A press of the thumb-button does the trick.

ting extension equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 541.

Kewanee and Ross Combine

Two divisions of American Radiator & Standard Sanitary Corp. have combined to form a new subsidiary. Kewanee Boiler Corp., Kewanee, Ill., and Ross Heater & Mfg. Co., Inc., Buffalo, N. Y., will now be known as Kewanee-Ross Corp. Kewanee manufactures steel heating and power boilers and Ross makes shell and tube heat exchangers, surface condensers, and allied equipment. Both units of Kewanee-Ross Corp. will continue to operate as before in their respective locations, but their management, personnel, and facilities will be merged to provide a substantially broader scope. Kewanee's heavier facilities will be utilized to produce some large-size Ross units, while the Ross facilities

will be thus made available to produce increased quantities of smaller units.

W. Bradford Russell, formerly President of Kewanee Boiler Corp., is

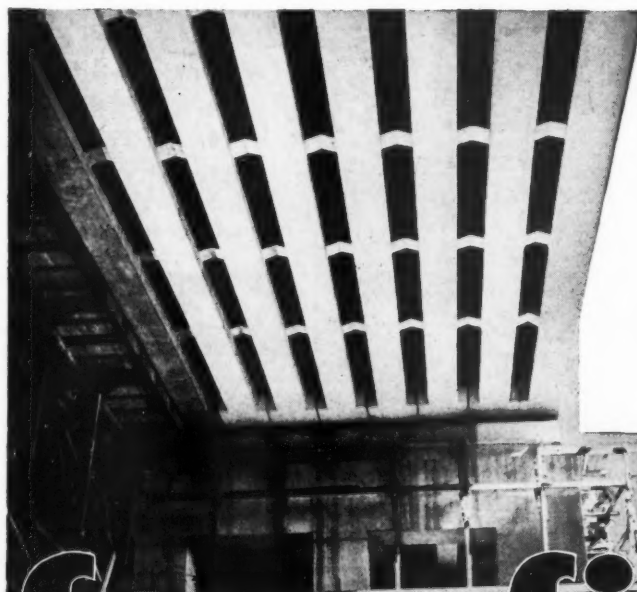
President of Kewanee-Ross Corp.; and Charles H. Currier, formerly President of Ross Heater & Mfg. Co., is Chairman of the Board of Directors.



The automatic exhaust pipe cover. Sizes available to fit from 1" to 6-3/16" exhausts, O. D.

WEATHERCAP provides positive year 'round protection for all engines with vertical exhaust pipes: compressors, road pavers, mixers, crushers, generators, etc. Fully automatic—opens and closes instantly by means of engine exhaust. Seals out rain, snow, dirt, insects... prevents flooded pistons, cracked cylinder heads, rusted or warped valves. Quality-built of heavy gauge steel with balanced fins made to uniform specifications conforming to engine exhaust pressures. Low in cost — years of service. Immediate delivery. Write today for full particulars and prices.

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clean, smooth beams and piers of pre-stressed concrete



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to produce a clean, smooth concrete finish use

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freedom from staining on apartment project

All over America contractors report that Formfilm is the practical and economical answer for the protective coating of valuable plywood forms. Since it is easily applied and reapplied on the job, Formfilm has many advantages over any other protective finish for concrete forms. Heavy scratches for instance, can be quickly recoated when Formfilm is used at the job. Formfilm is now being widely used in "tilt-up" construction.

ADVANTAGES OF FORMFILM

- Increases speed of form handling
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CEM-8



Salsbury pressurized Flo Guns handle caulking and sealing compounds and mastics on standard air-line pressures; or they can be hand-screw-pressured.

New Pressurized Guns

A line of air and screw-pressured guns for extruding caulking and seal-

ing compounds and mastics is announced by Salsbury Corp., Pneumatic Tool Division, 1161 E. Florence Ave., Los Angeles 1, Calif. Flo Guns are available in 3/10 pint, 1 pint, and 1-quart sizes, the largest weighing less than 4 pounds. Both the larger sizes may be obtained with either steel or stainless-steel barrels, while disposable barrels are available with the small gun for use with extra-sticky or fast-setting compounds. Two different types of nozzles are furnished with each gun.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 432.

Brochure on Compaction

A 12-page brochure on pneumatic-tire compaction equipment has been released by the Road Machinery Division of Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave., S. E., Minneapolis 14, Minn. It contains condensed background information on rubber-tire-compaction developments in the con-

struction of superhighways, heavy-duty airfield runways, and giant earth dams.

The brochure cites results of compaction tests and gives charts describing the performance of Bros 35 and 50-ton Roll-O-Pactors in various types of fills. It is illustrated.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 444.

New Monsanto Division

Monsanto Chemical Co., St. Louis, Mo., has formed a new Merchandising Division to handle the consumer sale of Krilium soil conditioner and other Monsanto products. Roy L. Brandt is General Manager of the new division, which is the Monsanto company's seventh.

Learn Why
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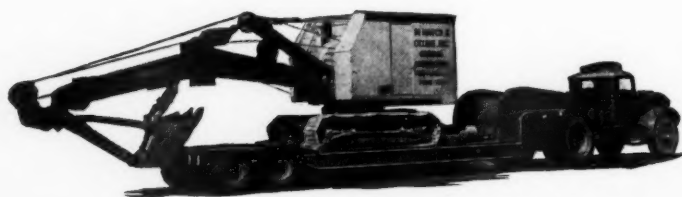
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With a Maginniss HI-LECTRIC Vibrator, concrete placing in any type of form is faster, cheaper, effortless, with a better looking job when the forms are removed.

The HI-LECTRIC Vibrator is strictly one-man operated. The on-off switch is at his hand, while the power unit operates unattended up to 200 feet away.

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The powerful front drivers of the AUSTIN-WESTERN Master "99" Power Grader, working high on the slope, gives several more feet of blade reach; while the rear drives hold the grader down to its work. ROCKFORD CLUTCHES control the power transmission in this rugged unit. Let ROCKFORD clutch engineers help give your machines equally dependable, heavy-duty controls.

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ENGINEERING
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REQUEST



Arsham Amirikian receives the 1952 Concrete Reinforcing Steel Institute Award. Professor H. J. Gilkey of CRSI hands it to him.

CRSI Design Award For Navy Engineer

Each year the Concrete Reinforcing Steel Institute presents an award for outstanding contributions to the development of reinforced concrete through research, new and improved design concepts, or improvements in construction practices or methods. The award, which consists of \$500 and a certificate, went this year to Arsham Amirikian, Chief Designing Engineer, Navy Bureau of Yards and Docks.

Mr. Amirikian, who joined the Bureau in 1928, is in charge of the design of special shore and floating structures and is Structural Consultant for the Navy. His wide engineering experience has been concentrated in recent years on thin-shell precast-concrete construction and design of protective structures against bombs, conventional and atomic. He has new methods of analysis to his credit and has applied them to such important shore structures as airplane hangars as well as auxiliary floating craft for the Navy including huge floating drydocks and gate caissons. The modern precast-concrete technique, using thin-shell cells, ribbed panels, and hollow-section rigid framing, originated with Mr. Amirikian.

The CRSI award is the latest in an impressive list of awards Mr. Amirikian has received in recent years. Included in these are the First Grand Award of James F. Lincoln Arc Welding Foundation; the Fuertes Graduate Medal of Cornell University; the Navy's Meritorious Service Award in 1946; and the Lincoln Gold Medal of the American Welding Society. In 1942 Mr. Amirikian published "Analysis of Rigid Frames".

Track-Type Fork-Lift

A new crawler fork-lift has been developed by American Tractor Corp., 800 Fort Wayne St., Churubusco, Ind. The Terra-Lift is available in 2,000, 4,000, and 6,000-pound capacities, designated the M-2, M-4, and M-6. Lifts are made in heights of 6 feet, 8 feet 7 inches, and 12 feet. The unit can operate outside in all kinds of weather and

in mud up to 6 inches deep. When equipped with rubber track shoes, it can work inside warehouses and factories.

In addition to its uses as a fork-lift, the Terra-Lift can be converted, by means of easily mounted attachments, for use as a bulldozer, angle-blade dozer, loader, snowplow, etc.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 540.

Book on Statistical Theory

Designed for engineers engaged in scientific and industrial research and production, "Statistical Theory With Engineering Applications", a new book by Anders Hald, is published by John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y.

Dr. Hald, Professor of statistics at the University of Copenhagen, covers a large part of the statistical theory that has evolved during the past fifty years, with emphasis on the methods

developed by the famous R. A. Fisher. Hald gives a simple and coherent exposition of the theory without using advanced mathematics. The book stresses normal distribution and the tests of significance connected with this distribution.

Published in conjunction with this book is Professor Hald's "Statistical Tables and Formulas" which includes

a comprehensive collection of material of practical importance to users of the text volume. Both books are additions to the Wiley publications in statistics, edited by Walter A. Shewhart.

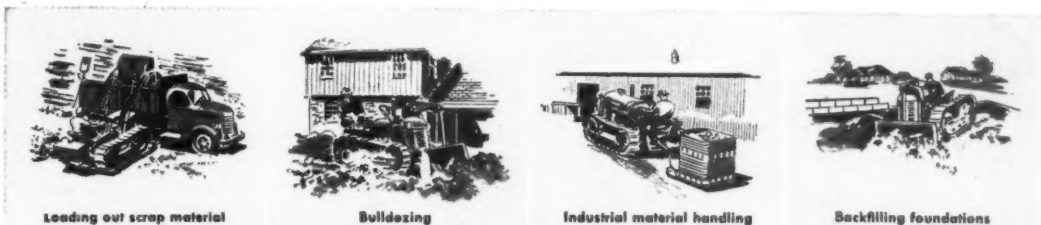
"Statistical Theory With Engineering Applications" contains 783 pages and is priced at \$9.00. "Statistical Tables and Formulas", priced at \$2.50, is a 97-page book.

BATTERY-OPERATED GREASEMASTER

- Attaches to any vehicle.
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Take the Word of ...Thousands

Don't just take our word for the real, day-to-day usefulness of the Oliver "OC-3". Take the proof offered by the *thousands* of users . . . the *thousands* of uses . . . of this powerful little tractor. Just ask any owner what he thinks of his "OC-3". In the more than 12 years that the "OC-3" and its predecessor, the "HG", have been in production, they have built a reputation for user acceptance that's unequaled in their class. Proof of this is the fact that it's mighty hard to get a used "OC-3". Users just don't often sell their "OC-3" tractors.

With an "OC-3" and its broad line of matched equipment . . . bulldozer, trailbuilder, front end loader, lifting fork, sidewalk snow plow, hydraulic drawbar, winch, logging kits, and many others . . . you can perform all sorts of useful tasks *every day*.

The "OC-3" has plenty of power to handle all those jobs with ease . . . a full 22 drawbar h.p. It's ruggedly built to keep maintenance and operating costs down.

Why not have your Oliver Industrial Distributor give you all the facts on the "OC-3", the lowest priced industrial crawler tractor built. Call him or write direct to The Oliver Corporation, Industrial Division, 19300 Euclid Avenue, Cleveland 17, Ohio.



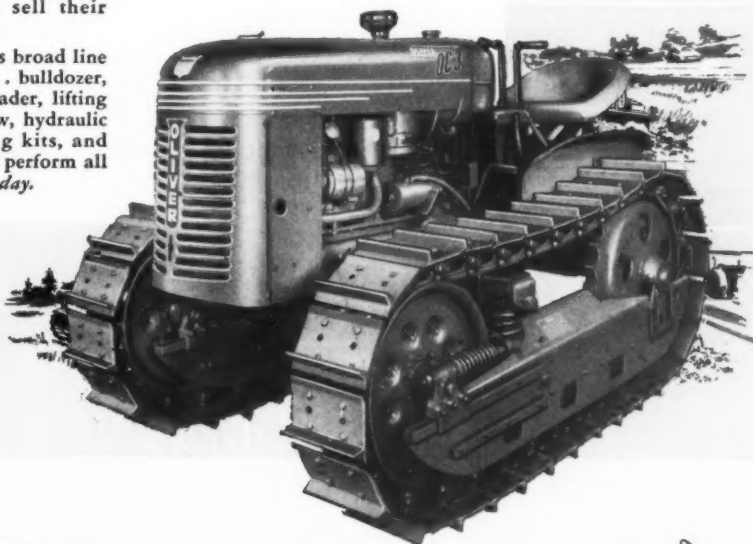
Sidewalk snow plowing



Loading out topsoil



Winch operations



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Note the crawler mounting of this Terra-Lift fork-lift which enables it to work indoors or out on all terrains.

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By ALBERT E. H. DUSSEK,
A. E. H. Dussek, Ltd.,
Bromley, Kent, England

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The first really satisfactory water seal—eliminates seepage problems, simplifies form work.

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Company _____
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City _____ Zone _____ State _____

It is gratifying to hear it now being said in America that rubber roads are the roads of the future. I would go further and say that rubber-asphalt roads are the roads of today. Work done with the right types of rubber and asphalt over 14 years ago offers conclusive proof of this.

Rubber-Asphalt in England

Asphalt, as we in England understand the word, is a composition of coarse and fine stone, sand, filler, and bitumen. (In America, I am aware, asphalt means either the mix or the bitumen). Although asphalt in one form or another is considered a most reliable and economical type of road surfacing,



A rubber-asphalt road in Deptford, England. The picture was taken ten years after the road was laid, no upkeep having been necessary in the meantime.

it has some shortcomings. These I found could be overcome by the inclusion of a suitable form of rubber powder, thus making a road surface which possesses the advantages of both asphalt and rubber, with none of the disadvantages.

Before going further, I should like to make it clear that I have no interest whatever in rubber. I write as a road engineer, with the desire to pass on the benefit of my experience in rubber-

(Concluded on next page)

NEW All-Steel SAFWAY SHORE

- ✓ Goes Up Faster
- ✓ Holds More Weight
- ✓ Less Maintenance



You will get important savings on every shoring job when you use the new one-man, all-steel Safway Shore: **YOU SAVE TIME**—because Safway Shores are erected so easily. Just extend upper tube to approximate adjustment—fasten with pin—rotate sleeve nut to exact adjustment.

YOU SAVE LABOR—because one man can carry, locate and adjust Safway Shores. Handle is at chest level. No nailing or bracing in most cases. Shores will stand alone.

YOU SAVE MONEY—because fewer Safway Shores are needed to support the same loads (capacities to 9,900 lbs.). Less maintenance required—sleeve protects threads.

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- Handle High Work—Shores easily mounted on legs of standard Safway frame-type scaffold.
- Bracing Brackets—For heights over 12 ft.

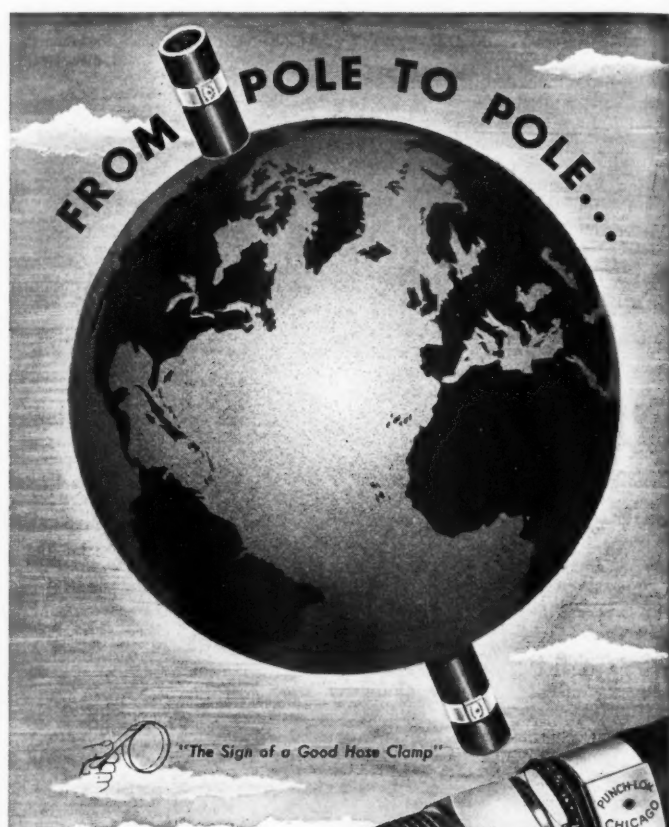
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TO CONQUER CANCER

asphalt road work to anyone interested in the subject in the U. S. A., Canada, or elsewhere. I use scrap-tire rubber, because I have found, by practical experience, that it gives better results, when mixed with asphalt, than raw, latex, or any other type of rubber.

In the beginning, it was necessary to determine what was required of a rubber-asphalt road. It was obvious that it would be useless to employ rubber with asphalt if the results did not warrant its addition. It was necessary that the cost should compare favorably with that of other forms of road construction. It was equally essential that rubber asphalt be prepared and laid as easily and speedily as ordinary asphalt or concrete in continuous form over any length or area; that it set quickly and be open to traffic at once; that it neither wave nor creep under heat, nor fracture and crack in cold weather. It had to be resilient and noiseless, wear evenly, and remain non-skid throughout its entire thickness and life.

To obtain these desired properties, a sufficient quantity of suitably prepared rubber is necessary. Scrap-tire rubber, I found, retains its identity; it is not melted or dissolved in the asphalt; and because of its low cost, it is possible to use the necessary quantity. In this case, the best and simplest process happens to be the cheapest.

The Mix

Rubber-tire powder is added to the stone, sand, filler, and bitumen and evenly distributed throughout the composition during the mixing, with the result that numerous particles of rubber project through the road surface. These rubber particles prevent slipperiness, and the composition offers a more resilient surface, while at the same time the effect of heat is decreased.

Surfacing of this type has withstood the tests of time and effects of arduous service. Where it has been laid in the London area, nothing whatever has had to be spent on maintenance or upkeep.

One Example

In one case a stretch of rubber asphalt laid on a hill has stood up satisfactorily for 13 years without attention. This surface is subjected to a considerable amount of turning bus traffic from a terminus in an adjacent road. It has also been thoroughly tried by horse-drawn coal carts fitted with skid pans when descending the hill.

An adjoining control section of regular asphalt laid on the level and in a more favorable position has been taken up and relaid. Today it receives attention and surface dressing from time to time.

Before any of this rubber asphalt was laid on a public highway, it was subjected to all possible tests in the laboratory. The results on the road have exceeded all expectations.

Help insure America's security and your own. Buy U. S. Defense Bonds.

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Hayward makes all three—clamshell, electric motor, orange peel. A Hayward recommendation is unbiased.



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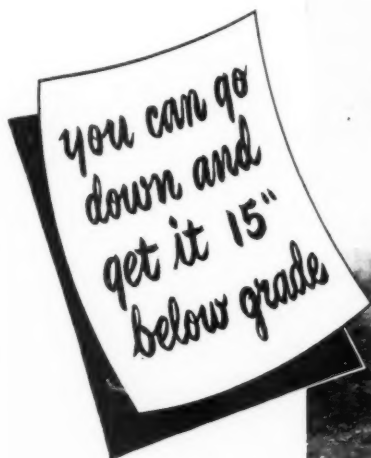
Rolling and completing a Dunsiek rubber-asphalt road. Scrap-tire powder is added to the composition and distributed evenly during mixing. Result, particles of rubber project through the road surface and prevent slipperiness.

Bulletin on Truck Winches

A bulletin describing the capacities and applications of the Model 2U and 3U low-mount winches has been issued by the Wayne Division of Gar Wood Industries, Inc., 36253 Michigan Ave., Wayne, Mich. The 2U weighs 330 pounds and has a rating of 15,000 pounds, while the 3U weighs 375 pounds and has a 20,000-pound rating.

The bulletin shows how the winch can be mounted in the back of the cab and at the rear or front of the chassis. In back of the cab it leaves the entire body for the payload and is available with cab controls. In rear-chassis mounting, the rope can be used for direct pull from the rear or it can be passed under the body and used for loading. Front mounting makes the winches available for pulling the truck itself out of ditches or rugged terrain.

This literature may be obtained from the company by requesting bulletin No. 149T, or by using the Request Card at page 16. Circle No. 418.



**—and do it with CROWD AND HOIST . . .
no wheel traction . . .**

If you are doing excavation work you probably realize the mechanical advantages of big shovels—simultaneous and independent hydraulic crowding and hoisting, variable crowd action at any dipper position, changeable buckets, etc. But, do you know all these advantages have been engineered into the Dempster-Diggster to give you a faster, more versatile excavator, on pneumatic tires with a 1 cu. yd. capacity. In addition the Dempster-Diggster does anything a conventional front end loader can do—and does it faster at less cost with its 1½ or 2 cu. yd. bucket. In excavation the Dempster-Diggster is without equal for working in tight places . . . dumps at 11'3" height . . . travels at truck speeds from job to job. The versatile Dempster-Diggster is a fast, power-packed excavator and loader you can't afford to be without! Write today for our new catalog No. 1032. A product of Dempster Brothers, Inc.

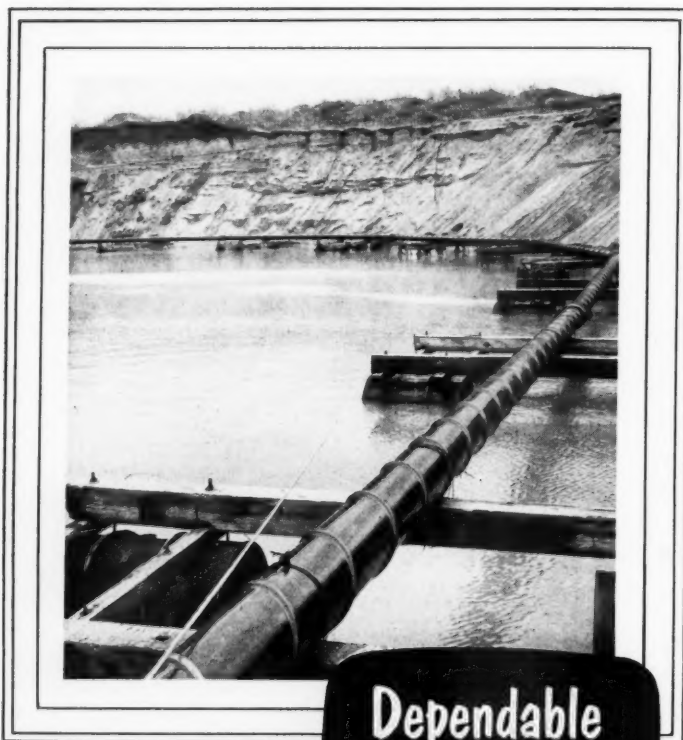


DEMPSTER BROTHERS, 482 Shea Building, Knoxville 17, Tenn.



The P&H Miti-Mite truck crane was designed exclusively for truck service. It converts to any front-end service.

Familiar Scenes IN DREDGING OPERATIONS



Its light weight makes Naylor Pipe easier to handle in dredging service. Its exclusive structure and distinctive reinforcing truss give it the extra strength to take the rough handling and battering to which pipe is subjected in this service. Its high salvage and re-use value are further considerations. That's why the characteristic Naylor spiral is so familiar on shore pipe, pontoon pipe, intake pipe, discharge pipe, and sand and gravel conveying lines.

**Dependable
Lines by
NAYLOR**

Write for Bulletin No. 507



Naylor Pipe Company
1270 E. 92nd St., Chicago 19, Ill.
New York Office:
350 Madison Ave., New York 17, N.Y.

A New Truck Crane Features Box Frame

A new truck crane designed exclusively for truck service is announced by Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis. The Miti-Mite features a single compact box that holds all the driving machinery. The upper section is welded integrally so that the power box acts as the machine frame supporting all shafts, drums, engine, counterweight, and front-end attachments.

A 6-cylinder gasoline engine provides power through a 4-speed transmission. Main drum and swing clutches are of the double-shoe internal-expanding type with outside cam adjustments. Hydraulic controls are

conveniently grouped for operator comfort. The full-vision cab has an adjustable foam-rubber seat with back rest.

The Miti-Mite is convertible to trench hoe, dragline, clamshell, crane. It has a $\frac{3}{8}$ -cubic-yard capacity as a shovel and a 7-ton capacity as a crane.

Further information may be secured from the company. Or use the Reader Card at page 16. Circle No. 422.

Rice Joins Heli-Coil

Edward H. Rice, Jr., is the newly appointed Manager of Customer Relations for Heli-Coil Corp., Danbury, Conn., manufacturer of wire screw thread inserts.

from Canal to Expressway




... with a
**750,000 YARD
FILL**

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Expert engineering utilization of this Owen principle of power application, based on unprecedented specialized experience, has made Owen the first and best known name wherever grab buckets are used.

Outstanding performance was doubtless a factor in selecting Owen buckets for this tremendous filling operation being handled at New Orleans by Jahncke Service, Inc. They'll do a job for you, too. Get the Owen Catalog.



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☆ Let Your Dollars Fight Polio ☆

New Boost for Old Pile-Driving Rigs

By M. D. MORRIS, ASCE

"Making Manhattan Modern" is the slogan of the Borough President's Office, and one of its recent construction jobs to this end was an elevated highway designed to keep automobiles out of the way of the commercial pier traffic on South Street. The highway will connect East River Drive at Jackson Street with the exit of the Cross-Battery Underpass, which runs from Coenties Slip east to the Brooklyn-Battery Tunnel entrance.

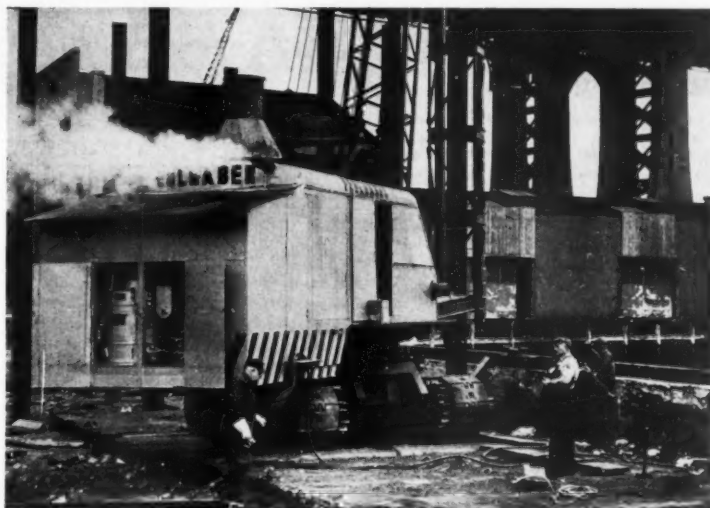
Fehlhaber Pile Co., a Manhattan firm, got the contract for the footings, and first ground was broken in May, 1951. Rate of progress will keep pace with the firm's steel allocation.

The design decided upon after subsurface investigation called for 117-pound 14-inch HB steel bearing piles under each footing, driven to a minimum depth of 65 feet and a maximum of 212 feet according to location, in clusters of 6, 8, 9, 11, or 12. The supporting columns of the superstructure (to be built by Fehlhaber Construction Co.) will be located on the centers of these pile clusters.

S. Jay Winterberg, Fehlhaber's Chief Engineer, decided on a McKiernan-Terry S-10 pile hammer. At first it seemed that the company's old Bucyrus 40-B 2-cubic-yard steam crane could do the job. But its power unit was a standard horizontal fire-tube boiler of 65-boiler-hp capacity (or 130-boiler-hp according to recently revised ASME definitions) and it was soon apparent, as pile length became greater and driving harder, that the boiler could not maintain sufficient steam to power the S-10 hammer for continuous driving. The time lag between finishing off a pile and placing another in the leads was not enough to allow the boiler to build up the pressure needed to overcome the initial drawdown. The problem was to increase steam production to a point where the S-10 hammer could drive consistently from its 2½-inch line.

A Littleford Model 1000-G Kwik-Steam generator, used as a booster turned out to be the answer. This unit can furnish a maximum of 1,080 pounds of steam per hour at pressures up to 200 psi—a capacity of 40 boiler horsepower—though it was not called upon to do so on this occasion. The generator, equipped with its own 11-cubic-foot steam receiver, was tied into the 2½-inch line at the quick-acting valve. The boiler started off, then the generator, powered by a 3.2-hp gasoline engine, was started and left to idle. As the driving increased, the boiler output slackened off, and this drop in pressure activated the generator, which supplied steam instantaneously to fill the lag until the boiler built itself up again. The small 3,200-pound generator was mounted on a platform at the crane's counterweight and kept weatherproof by a light corrugated housing. During the boosting process, it consumed about 6 gallons of No. 2 diesel oil per hour, drawing it from the boiler's fuel tank, and drawing water from the boiler's city-hydrant line.

Fehlhaber had another time-lag



Fehlhaber Pile Co., New York, N. Y., solves a problem in providing steam for its McKiernan-Terry S-10 pile-driving hammer on a Manhattan elevated-highway project. A Kwik-Steam generator boosts the capacity of the crane boiler.

problem further along the line, and used the same tactics to defeat it. This time the crane was a 2-cubic-yard Marion 480 with an old standard 65-boiler-hp vertical (haystack) boiler, and it had the same trouble with an S-10 hammer on a 2½-inch line. A second Littleford 1000-G Kwik-Steam booster was installed, and after that all was well.

Bulletin on Form Tamper

A bulletin on a one-man-operated form tamper is issued by The Cleveland Formgrader Co., Mills Road, Avon, Ohio. It shows how inclined tampers on the unit contact the earth under both sides of the form. Oil sprayed by the engine exhaust prepares the form face for pouring.

The tamper is powered by a 1½-hp Briggs & Stratton engine. It moves at the rate of 25 fpm, weighs 385 pounds.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 449.

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TRENCH ROLLER

SIMPLIFIES ROAD WIDENING JOBS



GALION — THE ORIGINAL

Galion originated the trench-type roller - and is now the first to offer a completely new and improved design.

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- Works 25" below to 6" above road surface - adjustment hydraulically controlled.
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871 Edgerton Street
St. Paul 1, Minnesota

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Formula Was Part of a Pile-Driving Contract

THE PROBLEM: Specs covering foundations of an airport apron building for Massachusetts required all piles to be "steel-encased cast-in-place concrete piles of a safe working-load capacity of 20 tons. . . . The safe value of piles shall be determined by the following formula." [Here details of the formula were given.] The engineers were empowered to, but did not, modify the formula.

Plaintiff was awarded the contract, although on a preliminary load test one of three piles subsided more than allowed by the specifications. In per-

formance of the contract each pile was driven according to the formula, under engineers' supervision. When nearly all of the 4,354 required piles had been so driven, the contracting authority ordered a test, which showed that some of the piles did not meet the 20-ton weight test. Under dispute as to the contractor's liability for the cost of driving extra piles, an extra order was issued, without prejudice to the Commonwealth's contention that the deficient piles did not accord with the contract. Was the contractor entitled to the cost of the extra piles?

THE ANSWER: Yes. (New England Foundation Co. v. Commonwealth of Massachusetts, 100 N. E. 2d 6, decided by the Massachusetts Supreme Judicial Court.)

Substance of court's reasoning: The engineers had ordered driving to stop on each pile when at least the minimum requirements of the formula had been met as measured by the engineers. Not until after 4,325 of the 4,354 piles were driven did the engineers use their authority to order load tests, and the formula could be modified only on the basis of such tests. The wording of the contract and the acts of the parties during performance indicated mutual understanding that the requirement of "a safe working-load capacity of 20 tons" was to be read in connection with the formula clause, and was not an absolute undertaking on the part of the contractor that a 20-ton test would be met. The cost of a load test of each pile would have been prohibitive—more than six times the contract price of \$512,000. The tests would also have impeded progress of the work. The contractor was not left "at the mercy of the formula as originally defined", but was entitled to rely on it until it was modified by the engineers according to the contract. "To hold that the contract amounted to an absolute guarantee that each pile would support a safe working load of 20 tons would make the formula clause of little or no significance."

Cement-Dust Nuisance Was Not an "Accident"

THE PROBLEMS: (1) A policy insured a highway contractor against liability for personal and property damages "caused by accident". In the operation of a cement-loading mill for four months, the air was impregnated with cement dust. Did the policy cover damages sustained by a nearby property owner on account of this dust? (2) The insurance company refused to defend suit brought against the contractor by the property owner. Was the company liable for the contractor's expense in making such defense?

THE ANSWERS: No. (United States Fidelity & Guaranty Co. v. Briscoe, 238 Pac. 2d 754, decided by the Oklahoma Supreme Court.)

(Continued on next page)

**"We didn't know a paver
could be made this good!"**

*Says John B. Taylor, Paving Contractor,
about the new Worthington Paver*



"SELDOM DO WE ENDORSE ANY CONSTRUCTION EQUIPMENT" begins a letter from John B. Taylor, Taylor Brothers president, pictured here on the job, "... but after using the new 34E . . . we feel it our responsibility to write you."

According to its president, John B. Taylor, Taylor Brothers Company, Inc., paving contractors from Birmingham, Michigan, have found that the new Worthington Model WP paver will lay more highway faster and at lower cost than any paver his company knows of.

Says Mr. Taylor: "We thought we knew about your pavers' superiority after using them for 20 years, but this new 34E beats them all."

The Taylor Company has been using its Wor-

thington Dual Drum Paver on a paving job near Dearborn.

The new Worthington paver is the practical result of forty years of experience in building pavers and other construction equipment. Learn how it can help speed your paving jobs by writing for Bulletin R-1700-B7 to Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Construction Equipment Division, Plainfield, New Jersey.

NEW WORTHINGTON DUAL-DRUM PAVES 34E work for Taylor Brothers on a paving job near Dearborn, Michigan. Taylor's job reports indicate that the new paver, with its six-and-a-half-second skip, faster transfer and discharge automatic water control system, and hydraulically controlled bucket, is laying more highways and streets at less cost.



If It's A Construction Job, It's A **BLUE BRUTE** Job

WORTHINGTON



Construction Equipment

MOVING? Be sure to give us 30 days' notice of your change of address—and let us have your old as well as your new address.

Unless you do this you may skip an issue or two before the correction is made—and you won't want to be missing any issues of **CONTRACTORS & ENGINEERS MONTHLY** these days!

**CONTRACTORS AND ENGINEERS
MONTHLY**

470 Fourth Ave., New York 16, N.Y.

Avoid Legal Pitfalls

(Continued from preceding page)

The court said that the mill was intentionally operated in a negligent manner; that the method of operation could have been enjoined; and that in no proper sense was the injury accidentally inflicted.

The opinion cited a decision by the Circuit Court of Appeals, Second Circuit, that a policy insuring a dredging company against liability for accidental injuries to employees did not cover tuberculosis contracted by an employee through the damp and unsanitary condition of premises on which he was required to work. (Taylor Dredging Co. v. Travelers Insurance Co., 90 Fed. 2d 449.)

The court also cited several decisions

on the point that an insurer is not bound to defend a suit when it would not be liable under its policy for judgment against insured. In one of those cases, decided by the Court of Appeals, Tenth Circuit, a pipeline-construction company was insured against liability for injuries resulting from business operations carried on in its places of work, etc. The court ruled that the company was not insured against liability for injury caused by a dynamite cap left on the pipeline by the construction company's employee, the company having finished the job and surrendered possession of the premises. (Kelly-Dempsey & Co. v. Century Indemnity Co., 77 Fed. 2d 85.)

Subcontractor Could Not Complain About Settlement

THE PROBLEM: A Wyoming town awarded a sewer contract to a partnership at \$54,344.80. The firm sublet the job to a corporation at 85 per cent of the sum to be received by the firm, less invoices and payrolls. After the work was completed the firm notified the subcontractor that it (the firm) and the town would meet to reach a settlement, and invited the company to be present. The subcontracting company did not appear and the firm and the town agreed on \$55,912.46 as the amount due under the prime contract. Was the subcontracting company bound by that agreement, in the computation of the percentage due it under the subcontract?

THE ANSWER: Yes. (Dawson, Corbett & Shelp v. Lieurance & Canfield Construction Co., 235 Pac. 2d 457, decided by the Wyoming Supreme Court.)

Job Disability Not Total

THE PROBLEM: An accident permanently disabled a bulldozer operator from pursuing that occupation, but he remained able to drive trucks, etc. Was he entitled to an award for permanent total disability?

THE ANSWER: No. (Blackwell v. Wimberly, 53 So. 2d 814, decided by the Louisiana Court of Appeal, Second Circuit.)

Use of Convict Labor

THE PROBLEM: The California constitution prohibits hiring convicts to any person or firm, but requires that they

be worked "for the benefit of the State". Does that prevent the Legislature from providing for use of convict labor in constructing and maintaining county highways?

THE ANSWER: No. (Copeland v. Kern County, 234 Pac. 2d 314, decided by the California District Court of Appeal.

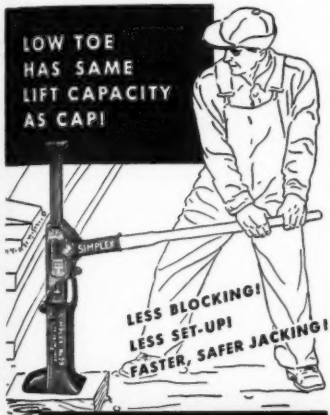
Fourth District.)

The court decided that both new construction and maintenance were included in California statutes permitting county boards to have road work done under the supervision of a commissioner or by contract letting. It also decided

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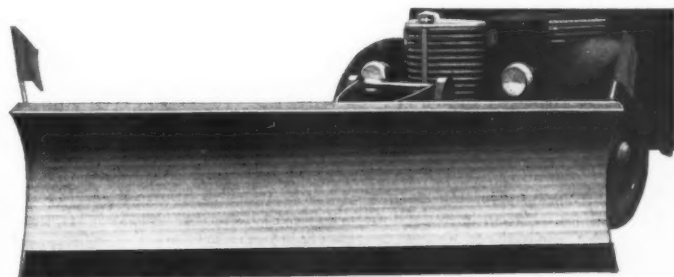
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With Simplex Ratchet Lowering Jacks minimum toe clearance is necessary. Loads are usually lifted from the ground to the toe of the jack by pinch bars or wedges. Only Simplex Jacks provide equal lift capacity on toe or cap. No other jacks offer such a combination of low cost and all-purpose utility. In fast jacking action—extra-safety features—and rugged strength for longer life, Simplex Ratchet Lowering Jacks give you more for your money! Available in capacities of 1½ to 35 tons. Write today for Bulletin: Industrial 49.

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¾" x 6" flat, square edge
½" x 6" flat, square edge
¾" x 6" flat, double bevel
½" x 6" flat, double bevel
¾" x 6" flat, double bevel
½" x 8" flat, square edge

Bulldozer and Earth Mover Blades

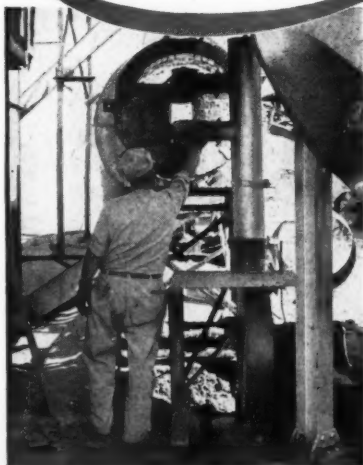
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GLOBE CONSTRUCTION
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KALAMAZOO, MICHIGAN



"HOPKINS UNITS GIVE US

Savings of Over 25% In Fuel Oil"

Looking for a good asphalt plant combustion system? Let Mr. M. V. Carmody, Vice President of the Globe Construction Co., tell you about Hopkins Volcanic equipment: "We used our first Hopkins equipment during the 1950 paving season—the Hopkins Motor Blower with Hopkins Volcanic Burners—for atomizing fuel oil by low pressure air instead of by steam, in our asphalt plant aggregate drier. At the time of purchase, it was indicated that the units would reduce our fuel oil consumption by 25% on the drying operation. The result was a saving of over 25% in fuel oil used.

"On the strength of last year's operation, we purchased two more units for our other plants, one of which uses oil for fuel and the other, natural gas. They are both working out very satisfactorily."

Hopkins' efficient, low-cost operation can do a lot for your plant, too. Why not write or phone us today for descriptive literature and complete details

HOPKINS VOLCANIC SPECIALTIES, INC.
ALLIANCE, OHIO

Avoid Legal Pitfalls

(Continued from preceding page)

that provision for doing the work by "day labor" permitted use of regular road crews and prisoners, as well as inexperienced casual workers.

False Statement Convicts Though Sum Obtained Small

THE PROBLEM: A subcontractor was prosecuted for obtaining a check from the prime contractor by falsely stating that labor and material bills had been paid. Could he escape conviction in the ground that the contractor owed him the amount of the check?

THE ANSWER: No. (Schultz v. State, 242 S. W. 2d 131, decided by the Arkansas Supreme Court.)

In refusing to set aside a conviction and one-year sentence—although the check was for only \$370—the court noted, in effect, that the question of whether the contractor owed accused that sum depended upon whether labor and material bills had been paid.

Obstruction of Pathway Made Contractor Liable

THE PROBLEM: During a street repaving, excavated material was piled on an adjacent pathway. No barricade, lights, or signs were placed there to warn pedestrians. Plaintiff walked into the pile and was injured. Was the contractor liable?

THE ANSWER: Yes. (Wesco Paving Co. v. Nash, 245 S. W. 2d 782, decided by the Tennessee Court of Appeals, Eastern Section.)

Engineer Entitled to Fee

THE PROBLEM: A city engaged an engineer to prepare plans and specifica-

tions for a construction project. He was engaged at a percentage fee based on the cost of construction, 60 per cent of the fee to be paid when bids for construction were accepted. It was agreed that if the city failed to proceed with construction, the engineer should receive \$15,000—the full sum to be paid on abandonment of the project.

Bids were received but none was ac-

cepted. Funds for the project were on hand, but it was at a standstill, although not abandoned. Was the engineer entitled to \$15,000, to be credited as a payment if the city proceeded with the work?

THE ANSWER: Yes. (LeFeber v. City of Norwood, 102 N. E. 2d 724, decided by the Ohio Court of Appeals, Hamilton County.)

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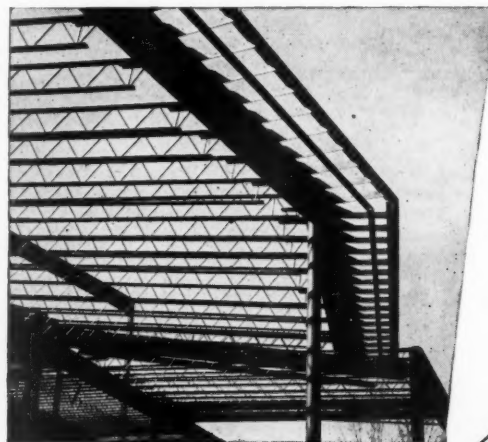
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How to Build Roads On Soft Foundations

N. Y. State Engineers Describe Both Removal and In-Place Treatment Methods of Supporting Embankments

• METHODS used in New York State to construct roads on soft foundations were reviewed at the 31st Annual Meeting of the Highway Research Board. M. N. Sinacori, W. P. Hofmann, and A. H. Emery of the Department of Public Works outlined the characteristics of soft foundations, types and extent of subsurface investigations, and methods of treatment.

In New York, they reported, deposits of soft materials exist where the topography is flat, the drainage poor, and the soil fine-grained or organic. The flat topography in many areas causes poor surface drainage. This condition permits long periods of sedimentation which help to form fine-grained deposits of high compressibility and low permeability, density, and shear strength.

Subsurface Investigation

The approximate type of subsoil is first determined by Government maps, aerial photographs, site inspections, and preliminary surveys. If these investigations show the presence of unstable material, a subsurface-exploration program is planned.

The first phase of the program consists of making holes to define the horizontal and vertical limits of the deposit. Also samples are obtained to evaluate general soil characteristics. In the second phase, undisturbed samples representing the entire profile are tested structurally in a lab. For some projects the first phase may provide enough information for the designers to select a foundation treatment.

The final choice, however, depends on a number of engineering factors. The desired height and width of embankment greatly affect settlement. Certain materials may be ideal, but not available. If the pavement is to be placed as soon as the embankment is completed, then settlement must be speeded up. Finally, job location may prohibit the use of any number of methods.

Removal by Excavation

New York State builds roads over soft foundations either by removing the material completely or by treating in place. Complete removal prevents instability and differential settlement; in-place treatments generally take care of only one of these factors.

Complete removal is done either by excavating or displacing the poor material. Excavation is considered when the soft deposit is reasonably shallow, the necessary borrow available, and when the embankment must be stabilized in a short time. If these conditions are not present, and the average stress in the foundation can be made to exceed the strength of the material, displacement methods can be used.

Excavation is generally economical where shovels can dig and cast in one operation. The side-cast spoils can be bulldozed to flatten the sideslopes after the embankment is completed. Enough material is taken out to offer stability to the shoulders and sideslopes.

Excavation may be either complete or partial. Complete removal is considered when the soft foundation is of reasonable depth, when the quantities involved are relatively small, when there is a possibility that large quantities of material will be trapped, and when stability must be reached in a short time. In New York, complete excavation

has been economical to depths of 35 feet.

Frequently, however, a very soft compressible material of low bearing strength is underlain at fairly shallow depths by a somewhat stronger material, less compressible. The surface

deposit will not safely support an embankment of the desired height, but the second layer will. Furthermore, the surface deposit is the seat of a greater portion of the expected settlement. In this case it is often economical to excavate the surface layer and build on the underlying stronger but still compressible material, allowing the embankment to undergo the smaller settlement of the second layer. Having reduced the thickness of the compressible layer by partial excavation, the time required to eliminate settlement within the thickness remaining will become much shorter.

Partial excavation is also used in uniformly soft deep deposits where the remaining material beyond the depth of excavation can be displaced by the

embankment weight or surcharge.

Removal by Displacement

The extent of displacement depends on the superimposed weight, the strength of the underlying soil, uniformity of material and profile, the geometric relation of width and depth, and the presence or absence of any restraining forces.

As soft material displaces from under an embankment, it builds up as mud waves on the sides or in front of the embankment. These waves act as passive restraining forces, reducing the tendency for further displacement. In some instances the embankment weight is great enough to displace all of the soft material. In other instances additional

(Continued on next page)

6

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How to Build Roads On Soft Foundations

(Continued from preceding page)

tional weight is required to permit full displacement and overcome the restraining forces present or developed.

Generally, in uniformly soft materials, once an embankment has started to sink, it will continue if maintained at the same top elevation, and if any mud waves formed adjacent to it are removed. This will occur because the fill material replacing the soft foundation is of greater density, and proportionately increases the total superimposed weight. However, if not removed as it forms, it is possible for the mud wave to build up enough restraint to check any further sinking.

A wide embankment placed on a soft foundation sinks unevenly across its width, with the maximum settlement occurring about halfway between the toes and the center line. This type of "heart-shaped" settlement leads to the possibility of entrapping a central core under the embankment, producing undesirable differential settlements after construction.

Some foundation soils, such as soft mucks and peats, organic silts, and marls, may be displaced from under embankments rarely by superimposing normal embankment heights. This type of displacement is generally considered when the embankment planned weighs enough to displace the material, and when any material that may be entrapped under the embankment will become adjusted within the time permitted before paving. For some projects provisions are made to remove the mud waves as they develop adjacent to the embankment, and to cast the material beyond the limits required to permit free displacement of all underlying material.

A surcharge may be added to the embankment during construction if its normal height is not enough to displace the underlying soft material, or if there is a possibility of entrapping enough material to result in undesirable differential settlement. This surcharge helps by inducing additional displacement, and by causing the normal settlement to take place more rapidly.

Explosives for settling embankments have been used in New York to help displace soft foundations, whenever the weight alone or the weight and surcharge were not sufficient to accomplish the displacement. Depths of unsuitable material displaced by this method have varied from 5 to 24 feet. The amount of dynamite used has ranged from $\frac{3}{4}$ to $1\frac{1}{4}$ pounds per cubic yard of material displaced. In general, these projects were done under contract on a unit-price basis per pound of dynamite used. Subsequent performance of these embankments has been highly satisfactory, and the method is still considered where applicable and economical.

Treatment for Stability

The nature of many highway projects is such that removal will result in excessive quantities, difficult and impractical construction, and unreasonably high costs. In addition, many materials generally classified as soft and weak, although not completely adequate for embankment foundations in their natural state, can be made suitable with special treatment or with modifications in design.

In-place treatment should satisfy the two requirements of stability and settlement, as determined by the specific projects. Where it is planned to retain the soft material as part of the embankment foundations, the requirement for stability against lateral movement should be satisfied. Stability can be increased by decreasing the foundation stress, increasing its strength, or by providing confining or restraining

forces.

In some instances the strength of a soft foundation layer is not sufficient to support the weight of an embankment constructed according to normal procedures. However, due to its relatively rapid settlement characteristics, such a foundation may gain enough strength during a slow-rate or partially delayed construction period to permit the embankment to be completed to its required height. For the method to be effective, the layer should have such consolidation properties and thickness as to permit rapid settlement under the weight of the part of the embankment initially placed. For a proper evaluation, complete settlement and stability analyses should be made, along with analyses of the effect of the rate of settlement on strength increase.

Another stability method, using lightweight material, reduces the embankment weight and the foundation stress by the ratio of the density of that material to the density of common borrow. Lightweight materials

generally used are cinders and slag. These, of course, can be considered for use only when they are available locally. Generally, cinders and slag have a total in-place density of 75 to 95 pounds per cubic foot and, compared to common borrow, show an equivalent

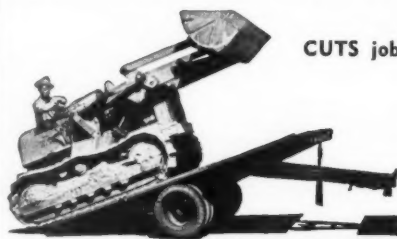
weight reduction of 30 to 50 per cent.

If a soft uniform layer of sufficient thickness fails under the weight of an embankment, the failure usually occurs in the form of a rotating slide, with

(Continued on next page)

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the failure surface approximating a circular cylinder. In cross section, this failure surface usually approximates a circular arc. For any section having specific strength values, there is one most critical circle showing the lowest factor of safety against failure, which can be determined by trial and error. Stability computations for any circular arc are made by equating the moments, about the center of the circle, of the actuating forces against the resisting forces. The actuating forces include the total weight on the embankment side of the center of circle, while the resisting forces include the shearing strength along the arc of failure and the total weight on the low side of the center of circle.

If the factor of safety resulting from such a computation indicates that failure might occur during or soon after construction, the stability can be improved by adding stabilizing berms as counterweights over the original ground. To be effective, these stabilizing berms should be built of such width as to have their center of gravity well beyond the center of the most critical sliding circle, obtained for the original section, and to cover the toe of this circle. The width and height of berm required for any project are also obtained by trial and error in the same manner.

In determining heights of berms, the stability of the berm itself must also be satisfied. The use of stabilizing berms only satisfies the requirement for stability. Gradual settlement of the embankment due to the consolidation of the underlying foundation soil may follow, and should be considered as a separate requirement.

Berms are also used to correct failures which occur during or after construction. In such cases the position of the failure arc can usually be determined from the locations of the shear cracks, the mud wave, and the depth of firm layer. This information can be used to compute the average shear strength of the foundation material during failure. A stabilizing berm can then be designed to counterbalance the actuating forces.

Sidehill construction of embankments sometimes leads to foundation failures caused by ground-water accumulation and movement. The ground-water movement may be deep-seated and not readily intercepted by ditches and underdrains. These conditions can influence stability by developing large seepage forces in the downhill direction which act to increase the sliding forces, and by developing artesian pressures which increase the buoyancy of the foundation soil and thereby decrease its effective weight and shearing resistance.

Where such problems exist, adequate subsurface exploration is essential, with careful observations made of water conditions. In many instances the severity of the problem is not recognized in the investigation and design stages, and the conditions remain unnoticed until during or after construction.

Treatment for Settlement

Embankments for which the stability requirements have been satisfied may still show considerable settlement long after construction.

In many instances a foundation is strong enough to support the weight of a normal embankment without the builder's anticipating shear failures; but due to the compressibility of the foundation material, objectionable settlements of long duration may occur after construction. The eventual solution to eliminate or reduce the effects of settlement will depend on the amount and rate of settlement expected, the uniformity and continuity of embankment and foundation, the presence of points of discontinuity such as bridge abutments, and the quality of roadway

constructed and results expected.

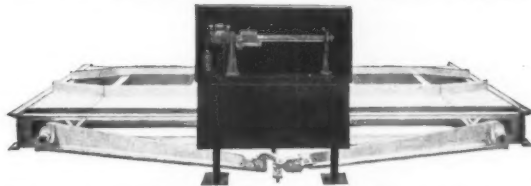
Normal construction procedures are generally followed in cases where the settlement expected is minor, or is uniform for long sections with proper transitions at the ends of the section, and where the quality of road is not affected. In these instances the settlement is expected but no precautions are taken to reduce or eliminate it.

Two-stage construction delays final paving after embankment construction until the detrimental settlement has been eliminated. This method is used mainly where the total settlement expected after construction is not excessive but is reasonably rapid, where normal construction practices would result in objectionable differential settlements, where additional borrow for surcharge is not readily available, and where the schedules of construction permit such delays. The postponement may vary from one construction season to several years. If it is planned to use the roadway during this period, a temporary pavement may

be placed, which can be readily built up as settlement occurs. Construction men generally refer to this method as permitting the section to "season".

More height is often added to an embankment as a surcharge to expedite settlement. This is feasible only where
(Continued on next page)

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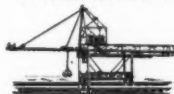
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MC 318

How to Build Roads On Soft Foundations

(Continued from preceding page)

the soft foundation is still strong enough to permit the addition of the surcharge without failure. The actual amount of surcharge needed depends on the thickness and the time-settlement relations of the compressible layer, the normal embankment height, and the over-all time available to complete the project. The additional weight of surcharge increases the amount of settlement obtained per unit of time elapsed. The surcharge can be removed after the amount of settlement expected under the normal-height embankment has been reached. If the compressible layer is deep or if the embankment is high, the amount of surcharge required to affect noticeably the normal time-settlement relations will be so great as to make the method uneconomical. Material used for surcharge may require double payment for handling,

unless use can be found for this quantity on other sections of the project after the surcharge is no longer needed.

In some instances reasonably shallow foundation materials in a relatively loose state can be compressed by heavy pneumatic-tire rolling to eliminate any possible settlement due to the subsequent weight of an embankment. For effective results, such materials should contain granular sizes and be above the water table.

Treatment: Stability, Settlement

Many soft foundations are critical with respect to both stability and settlement. In such cases a treatment to satisfy one requirement may directly affect the other requirement. In many instances several individual methods are combined to satisfy the requirements for stability and settlement.

Sand drains provide a means of accelerating settlement and permit a rapid gain in strength for soft foundations, by providing drainage channels through

which excess water may be removed. The increase in strength is often needed to permit the foundations to carry heavy embankments. Sand drains are especially effective in deep, soft, and compressible soil formations. By proper design of drain sizes and spacings and by the use of controlled rates of construction, embankment heights heretofore impossible can now be built over deep soft foundations. A careful analysis of stability and settlement is required for each project which makes use of sand drains.

Combination Method

A project requiring the use of partial excavation combined with a surcharge included a section of the New York State Thruway across Montezuma Swamp in west-central New York. The soil profile in this area consisted of a layer of peat and muck varying in thickness from 3 to 10 feet but averaging 5 feet, underlain by a deposit of marl from 7 to 15 feet thick, averaging 10 feet. The marl in turn was under-

lain by a deposit of silt and clay, which was reasonably firm. The normal water surface in this area was from 1 to 2 feet above the ground surface, maintained to this minimum level by dikes and gates to provide a wild-life refuge.

The general considerations which affected the over-all design were: (1) The water level in the area had to be maintained at the minimum elevation required by the United States Department of Agriculture, from 1 to 2 feet above the average ground surface. (2) There was a definite scarcity of granular material suitable for underwater placement, or for possible use as a drainage blanket in connection with sand-drain installation. (3) There was adequate supply of glacial-till soil suitable for common borrow and satisfactory for above-water placement. And (4) there would be a time lapse of one year, and possibly two years, between grading and paving.

Stability and settlement analyses on representative undisturbed samples of the various layers indicated the following:

1. The peat and muck layer would be unstable under the desired height of embankment, and would permit shear failures. Due to the approximately 180-foot width of the embankment section used, such failures would take place along the sides, but would entrap the major portion of the peat and muck under the central section of embankment.

2. The underlying marl layer would be stable under the weight of embankment and a moderate surcharge height, especially if the excavated peat and muck were spread beyond the embankment to add some counterweight.

3. The peat and muck, being highly compressible, in combination with the marl would cause large detrimental settlements of long duration if left in place or entrapped by normal construction, and a satisfactory pavement could not be placed during the desired time interval.

4. With the removal of muck, the settlement expected in the marl layer could be eliminated within a short time after construction, aided by a moderate surcharge placed on the normal embankment. A surcharge of such height as to stabilize the muck and marl layers combined would cause failure in the marl layer.

Based on these considerations, the final approved design involved:

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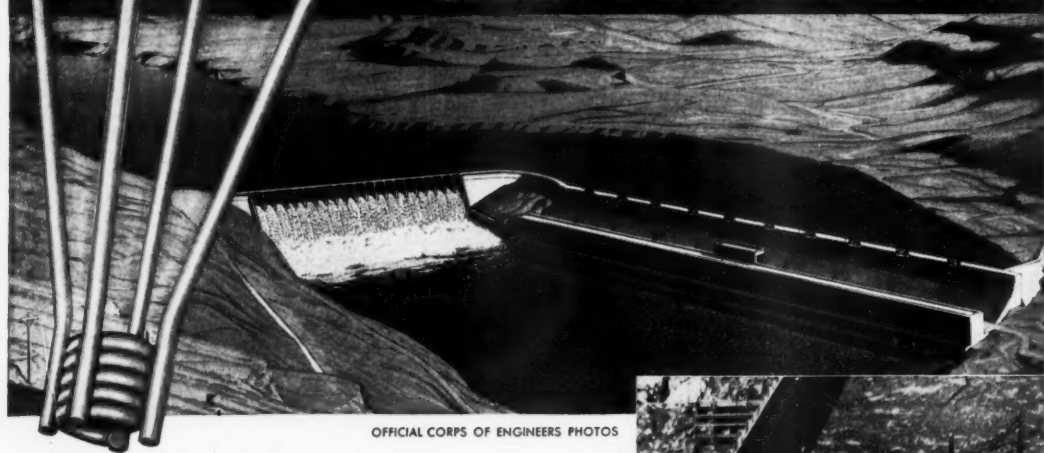


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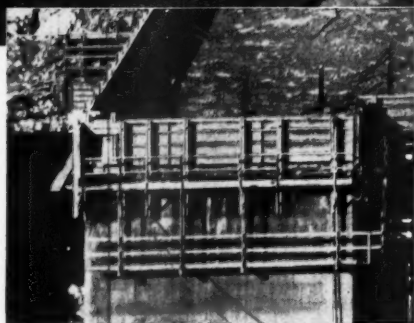
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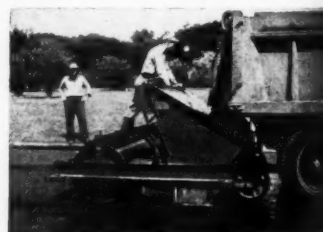
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5. Surcharges to be maintained a

minimum of one year.

Conclusions

In many instances, the treatment required for a soft foundation may be so costly as to justify a change in line and grade to avoid or minimize the effects of such foundations. A properly designed highway will reflect the least over-all expenditure consistent with the quality desired, based on the proper evaluation of all the factors which affect design.

In the solution of a project involving soft foundations, the various methods discussed are considered as competing with each other. By the very nature of each problem, some methods do not apply. Others may offer equally satisfactory results. The choice of the best

method depends on the evaluation of all the contributing factors, such as embankment dimensions, characteristics of foundation soil, construction materials available, construction schedule planned, location, and class of highway. In many cases the solution will include combinations of the methods listed.

The minimum factor of safety for any problem should be established by evaluating the accuracy of design computations and field and laboratory information.

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Bottom-Dump "Eucls" have struck capacities of 13 to 25 cu. yds. . . diesel engines of 190 to 300 h.p. . . top speeds loaded up to 34.4 m.p.h.

The Euclid Loader working with Bottom-Dump "Eucls", has set production records on many big yardage jobs. On this highway project "Eucls" were loaded with 13.6 bank cu. yds. in about 35 seconds.

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● Proof that Euclids are engineered and built for long life performance in off-the-highway service is found in the record—of the thousands built, more than 9 out of 11 "Eucls" are still in use!

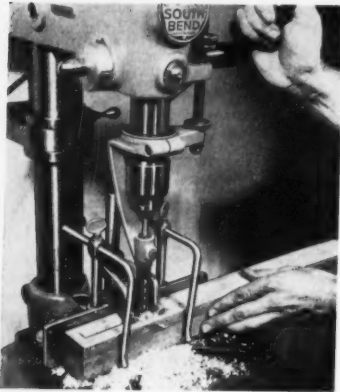
Engineered and built for lasting strength, Euclids are job proved for continuous operation, less down time and lower maintenance costs on a wide range of construction, mining and quarry work.

Ask your Euclid Distributor about the Euclid features that mean more loads per hour at more profit per load—large capacity, power and traction for steep grades, and speed on the haul road.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

Put "Eucls" on the job and be on more jobs!





The latest South Bend drill-press accessory—an improved mortising attachment with two guide arms that adjust separately to handle irregular-shaped pieces.

Mortising Attachment

An improved mortising attachment is produced by South Bend Lathe Works, 114 E. Madison St., South Bend 22, Ind. It consists of a fence assembly which bolts to the drill-press work table, a mortising chisel holder which clamps to the drill-press quill, and three mortising chisels and bits in $\frac{1}{4}$, $\frac{3}{8}$, and $\frac{1}{2}$ -inch sizes.

New features of the drill-press accessory include two guide arms which are attached to the fence and adjust separately to handle irregular-shaped pieces, and a 1-inch independent adjustment on the base of the fence. These adjustments are said to give the attachment capacities up to $5\frac{1}{4}$ inches under the forked hold-down and $4\frac{7}{8}$ inches between the guide arms and fence.

The mortising attachment fits all South Bend drill presses and can be adapted to most other makes having a $1\frac{3}{4}$ -inch quill and using a $\frac{1}{2}$ -inch chuck.

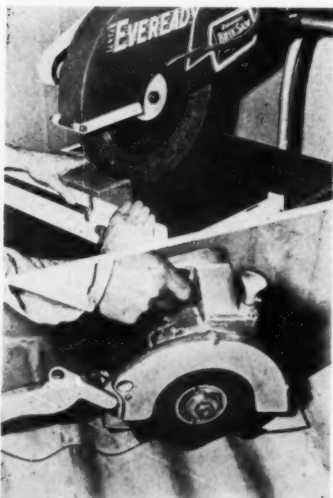
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 472.

Masonry Saw Blade

A reinforced masonry saw blade said to withstand twist, strains, and binds is announced by Eveready Briksaw Co., 1509 S. Michigan Blvd., Chicago, Ill. The Tuffie is reinforced internally with layers of fabric and has a safety web molded into its surface.

It is specially designed for cutting concrete block, cinder block, common brick, and the softer ranges of stone. Blade sizes range from 12 to 18 inches for masonry saws and 6 to 8 inches for hand power saws.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 406.

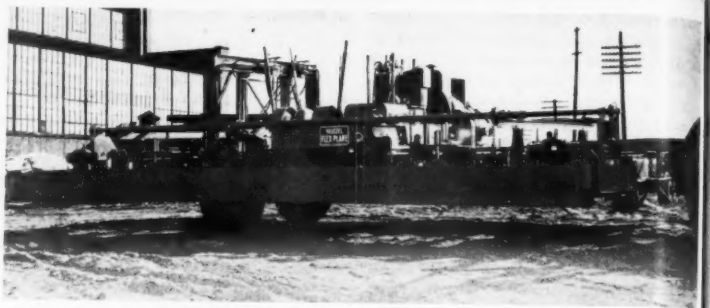


The Tuffie masonry saw blade is specially reinforced to withstand twist, strains, and binds.

Finishing Machine Moved Like Trailer

A finishing machine that lifts itself up off the forms and is pulled away on its own tires is offered by Flexible Road Joint Machine Co., Warren, Ohio. The two wheels nest in the frame of the Flex-Plane as it works on the forms. When the machine has to be moved to another location, a flick of a switch lowers the wheels and the machine becomes a trailer.

The telescopic unit is made in three basic sizes to finish widths from 10 to 27 feet. The screeds are both mounted on the outside of the frame, permitting the machine to rest lower in the forms and providing greater rigidity. Front and rear screeds may be adjusted to



This new Flex-Plane finisher will lift itself off the paving forms onto its own built-in pneumatic-tired trailer for fast attachment to towing equipment.

synchronize, counter-synchronize, parallel stroke, and similar arrangements. Further information may be secured

from the company. Or use the Request Card bound in at page 16. Circle No. 410.

"Dirt-movin'est tractor I ever saw!"



BIG RED CHAMPS! The TD-24s with 148 drawbar horsepower do more work per day—they have more horsepower and speed than any other crawler on the market. And they have Planet Power Steering, for pivot-turns, feathered-turns or turns with power on both tracks!



Concrete Drilling: Easier and Faster

Use of Tungsten-Carbide Inserts Revolutionizes Drilling in The Construction and Upkeep of Concrete Buildings

By CARL TILDEN,
Tilden Tool Mfg. Co.
As told to RAY DAY

• AT the Los Angeles County General Hospital recently, architects planned the routine installation of an air-con-

ditioning system. Unfortunately, however, the building had been completed and in use for many years, and 17 heavy reinforced-concrete floors lay directly in the path of the duct line. How could the concrete be removed in the midst of a busy hospital?

The problem is typical of many interesting examples in current building construction and maintenance. In this case, Contractor Harry Robinson of Los Angeles was on his toes, and called in modern drill bits with tungsten-carbide cutting edges. Using a 1-inch drill bit in a standard electric-drill motor, he removed the 17 blocks neatly and quickly by drilling 40 holes totaling 30 linear feet in each block. The job was soon over. There had been no interruption with hospital routine, there was a minimum of noise, and what was important to Robinson, he had completed the job well on the black side of the ledger.

As the tungsten-carbide drill bit revolutionized road building, mining, tunneling, and other such types of



Ray Day Photo

A very light scoring of the concrete with a pointed chisel is enough to start the Tilden tungsten-carbide bit. On flat work, the best method is to drill a round hole through a board and then stand on the edges of the board, using the hole as a guide for the cut.

heavy construction, so is it revolutionizing building construction and maintenance. Today the modern tungsten-carbide bit is rapidly replacing the old star drill and other such methods of boring holes in concrete.

Concrete Drilling Never Routine

Concrete drilling is seldom a routine or usual task. The very nature of a remodeling job is to repair or restore something that is old. When contractors get contracts which call for drilling in old concrete, they can never be sure that there will be enough room in which to work, that steel will not be encountered in the concrete, or that the drilling may not be difficult in the extreme. For example, one contractor in the east has an assignment to drill 6-inch-diameter holes in reinforced concrete in an A-bomb plant. His problems can well be imagined.

In modern building construction and maintenance there are several basic considerations for the contractor or superintendent to bear in mind when he contemplates rigging for the job. They are as follows:

1. Does the concrete contain reinforcing steel, and must it be drilled? If the architects will not permit the steel to be cut, then of course the problem is not so great. If reinforcing steel lies in the path of the drill hole, however, there are certain extra problems. Modern building drills like the Tilden Rotary Konkrete Kore Drill will bore right through reinforcing steel embedded in concrete. And if the steel can be hit squarely, where sufficient pressure can be exerted on the drilling machine, penetration is faster with little chance of a broken cutting edge.

(Continued on next page)



Ray Day Photo

This man wanted to install a heavy guardrail on the side of a tough concrete loading ramp. This electric-powered concrete drill cut through the tough wall like butter. Drilling time on a 5-inch hole was 1 1/4 minutes by the stopwatch.

Big Red TD-24s distinguish themselves building levees to control Missouri River

Near St. Charles on the Missouri River, the levees failed against the flood of '51. But Paul Crawley rebuilt them so they stood firm against the worst the river could do in 1952.

Crawley's contract called for moving 940,000 cubic yards of dirt. A big job, a tough job, in the bitter dead of winter. And for Crawley's money, the International TD-24s proved to be real Champs.

"They're the dirt-movin'est tractors I ever saw," he reports. "There's no other crawler to compare with 'em for daily work production!"

"They climbed the levee with full loads with no special ramps of any sort. They'd dump their loads, turn around on the 8-foot crown and go back down for another load. It was work that called for superior power and steering, and my TD-24s had it!"

Get the low-down on TD-24 performance from your International Industrial Distributor. You'll be a TD-24 man yourself from then on in!

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS



GOVERNMENT INSPECTOR, George Lemp, talks it over with prime contractor Paul Crawley (right).



CRAWLEY'S CRAWLERS did the job in a sea of winter mud that froze from time to time.



INTERNATIONAL

POWER THAT PAYS



Concrete Drilling Easier and Faster

(Continued from preceding page)

2. Is the drilling vertical or horizontal? This, of course, is an important consideration. If the drilling is all vertical on the flat, as for example on the floor of a building, progress will be faster and the work will be easier than if overhead or horizontal drilling is involved. Before committing himself to a job of any size, the drilling contractor should ascertain for himself the answer to this question.

3. Is it a one-hole job, or is a large quantity of drilling involved? If the job is exceptionally small or large, different methods of rigging up may be indicated. Where on a tiny drilling job some methods might be perfectly economical for one or two holes, the use of modern cost-cutting equipment on a larger job would probably mean a much greater net profit. In building construction as well as in any other kind of contracting, the machine which makes the most efficient use of power gives the best performance, and it is for this reason that many electrical and other small contractors have modernized their concrete drilling with faster, cheaper equipment.

4. Does the owner want a clean cut, or is a ragged hole permitted? If the answer is a clean cut, then the tungsten-carbide drill is obviously indicated.

5. Is noise a factor in the job? This, along with safety, is a more important consideration than might at first be suspected. The modern tungsten-carbide drill has now made it possible and practical to install steel partitions in offices or hospitals even while other work is under way.

At Salt Lake City, Utah, an interesting example to prove this point recently came to light. General Electric Supply Co., a subsidiary of G-E, was having all of its communications lines revamped along modern lines. The job involved extensive drilling through the concrete floors and walls, and Wasatch Electric Co. of Salt Lake City had been given the contract for the work.

When James Freebourn, sales head for our company, walked in and introduced himself, the purchasing agent was almost frantic. For days the pounding of hammers on star drills and the reverberation of jackhammers had dinned in his ears. When Freebourn offered to demonstrate a fast drill bit which would penetrate the concrete with a minimum of noise, the purchasing agent was quick to give him an invitation.

Freebourn went out to his car, got an electric-drill motor and a 1-inch



Kay Day Photo

This is a detailed view of the bolted floor connection on a tilt-up building job, with one brace in place and the hole for another being drilled.

Rotary Konkrete Kore drill bit. By the time he got back, the Wasatch Electric Co. men had marked the spot for the hole on the ornate floor of the

office. Freebourn lightly scored the asphalt tile with a chisel and quickly bored straight down into the concrete floor. As a result of this demonstration Wasatch Electric Co. now uses this type of drill for its Salt Lake maintenance work.

Generally speaking, there are a number of tungsten-carbide bits which will handle holes up to 1/2 inch in diameter. The Tilden Rotary Konkrete Kore Drill comes in stock sizes up to 8 inches in diameter. Drills in sizes 5/8 inch and over have interchangeable shanks for drilling any depth of hole. The bits carry from 2 to 24 tungsten-carbide cutters and feature a full-length core slot and spiral fluting to clear the hole. Special treating permits the use of exceptionally hard grades of tungsten carbide without the danger of breakage when the cutters go in service.

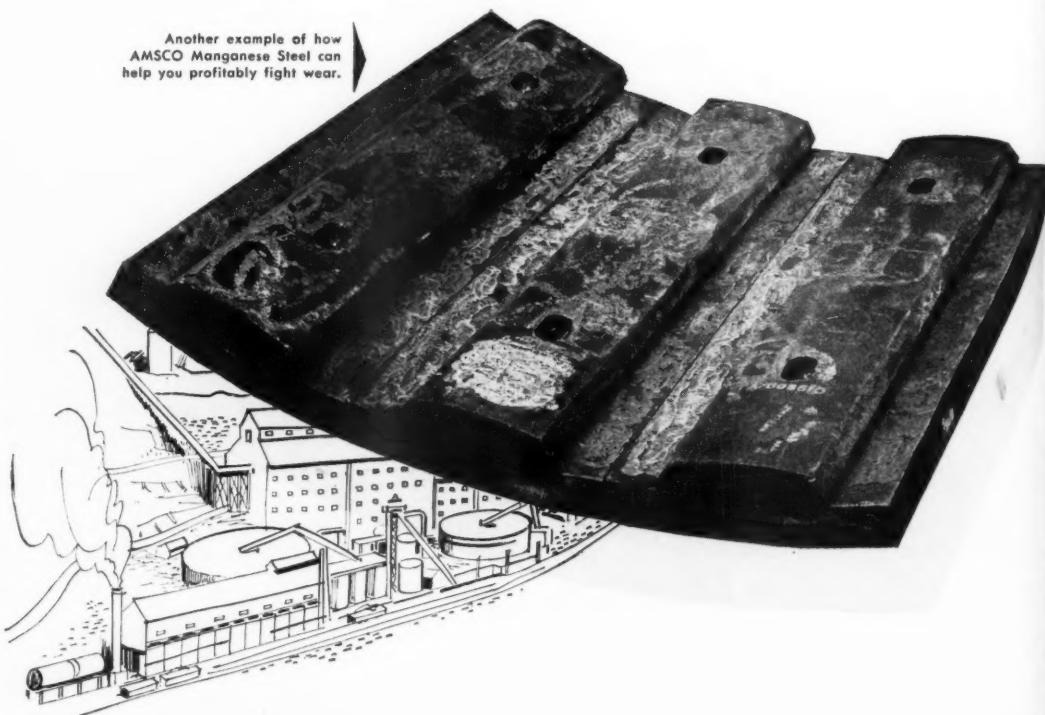
The design of concrete drills of the modern type is a relatively new science, and because the problem could be approached from scratch, it was pos-

sible to get the best performance from the tungsten-carbide cutters by taking into consideration the outer perimeter of the drill. On a solid-type bit, of course, the rate of turning speed of the outer perimeter is as important as it is on a core drill, because if the perimeter rotates too rapidly the drill edge will burn up. It is axiomatic that when the outer perimeter is turning at optimum speed the inner part near the center is doing little or no cutting. Any driller who has looked carefully at a worn bit can verify this fundamental of drilling.

In the case of core-type drills, however, the perimeter is the only part which is assigned to the cutting process. The inner part is used merely as a receptacle to contain the drilled material as it is broken up, and the slot opening makes it easy to discard the particles. This design has done much to speed concrete drilling in buildings which is usually governed by factors of noise, the desirability of speed, etc.

(Concluded on next page)

Another example of how AMSCO Manganese Steel can help you profitably fight wear.



These LINERS lasted 6 times longer

How AMSCO Manganese Steel increased production . . . lowered costs per ton

A large Western mine had a problem that's all too common . . . Rod Mill Liners that lasted approximately 100,000 tons before an expensive replacement job was necessary.

In July of 1949 something new was tried. This mine installed AMSCO Liners equipped with a specially designed renewable lifter. Result? The AMSCO Liners milled 640,208 tons . . . over 6 times the tonnage of the liners formerly used. There were two important reasons for this tremendous increase in service life:

1. The liners were made of AMSCO Manganese Steel, the toughest steel known for high resistance to abrasion and impact.
2. The overlapping type AMSCO Renewable Lifters took the brunt of the load—reduced the need for replacing the more expensive

liners. The lifters alone milled 340,322 tons . . . over 3 times more than the old installation!

WHEREVER YOU MEET A PROBLEM OF WEAR CAUSED BY IMPACT AND/OR ABRASION . . .

. . . find out about longer-lasting, dollar saving Manganese Steel made by AMSCO . . . world's largest producer of Manganese Steel Castings for all industry.

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Ample Power Urged

The best drilling performance depends on sufficient power behind the drill bit. As a rule, the cutting speed depends on the rate of drill rotation and the amount of pushing force exerted assuming that drill sharpness and other such factors are equal. This clearly emphasizes the need to select a motor of sufficient horsepower to rotate the drill at optimum speed when the proper pushing force is applied.

It is strange but true that tungsten-carbide bits will drill many more linear feet of hole if the drill operator applies sufficient pressure to force the cutters rapidly through the concrete or steel. A drill which "rides" a cut without sufficient force will wear out in far less footage than one operated by a man who knows his business. Tilden Tool Mfg. Co. sharpens and dresses many of the bits it manufactures and sells, and by far the greater percentage of dulled bits were made so by under-performance rather than by overdrilling. From 50 to 200-pound pressure may be safely applied to a 1/4-inch bit. Up to 300 pounds can be applied to 3/8-inch; from 150 to 500 pounds to a 1/2-inch; and from 200 to 1,000 pounds to a 3/4-inch drill. A good husky driller, a lever, or jacks can be used to apply the right pressure.

On the larger-diameter drills, a hose connection is supplied in many cases so that water can be used to cool the bit as it penetrates. On flat floor drilling, of course, water can often be applied manually. Water cooling, where it is practical, will do much to increase bit life.

Concrete drilling in buildings is rapidly approaching the same precise scientific level as that in mines or tunnels, where drilling costs are a significant part of the total cost of operation. As a matter of fact, the new type of tungsten-carbide rotary drills has now been introduced as standard equipment on the Demo-Canon tunneling machine, a giant drilling instrument mounting up to 30 drills at one setting.

Consolidated Hotels of Los Angeles use the improved drills and techniques on all building maintenance under the jurisdiction of this big hotel chain. Guy F. Atkinson is installing form bolts and stirrups on the new Colorado Street Bridge in Pasadena, Calif., with the help of such drills. Light and power companies, electrical contractors, plumbing concerns, and many other people in the building construction and maintenance field have been quick to adopt the new, improved drilling technique.

The drills are serving a humanitarian purpose, too, in addition to their speed and noise reduction in hospitals. Following the tragic Kathie Fiscus incident two years ago, when the little girl fell into an abandoned well shaft, Los Angeles officials ordered all abandoned wells to be capped with steel and concrete. In many cases it was necessary to drill holes in reinforced concrete, so that lead lugs and bolts could be installed to hold the steel covers. The job was done speedily and efficiently by tungsten-carbide core drills, in time to prevent other such tragedies.

It can truly be said that the tungsten-carbide insert did as much for building-concrete drilling as it did for general construction work when jackhammers were introduced to replace the manual hand-held drills of 1908.

PCA Personnel Changes

There have been four recent staff promotions in the Portland Cement Association, Chicago, Ill. G. Donald Kennedy, formerly Assistant to the President, is now Vice President. W. D. M. Allen, formerly Director of Promotion, is Vice President for Promotion while retaining his duties as Secretary. Miss

Evelyn Pinkerton and J. L. Schneider are appointed Assistant Secretaries of the Association.

Mr. Kennedy joined the Association in 1950 after many years of wide engineering experience, and Mr. Allen has been with the Association for 33 years. Miss Pinkerton, who joined the PCA in 1933, is the first woman officer in the Association's history. Mr. Schneider, with the Association since 1948, will continue his duties as Publications Editor of the Advertising & Publication Bureau in addition to his new responsibilities.

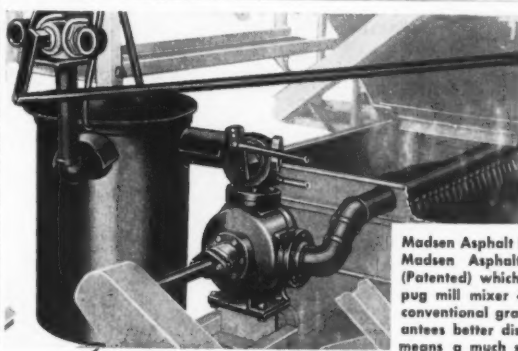
Unit Tests Concrete Cylinders on the Job

Field testing of standard 6 x 12-inch and 8 x 16-inch concrete cylinders is possible with a portable unit offered by Tinius Olsen Testing Machine Co., 1188 Easton Road, Willow Grove, Pa. The test specimen is placed between two compression surfaces, the upper one

being self-aligning, and the load is applied by a hand piston pump. A standard gage indicates loads from 30,000 to 300,000 pounds. A metric

scale is also available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 517.



MADSEN ASPHALT PRESSURE INJECTION SYSTEM

(Patented)
...injects asphalt into the mixer in 6 to 7 seconds!

Madsen Asphalt Plants incorporate the famous Madsen Asphalt Pressure Injection System (Patented) which injects the asphalt into the pug mill mixer 4 to 5 times faster than the conventional gravity flow method! This guarantees better distribution of the asphalt and means a much shorter mixing period... advantages that help make Madsen Asphalt Plants first choice of leading contractors.

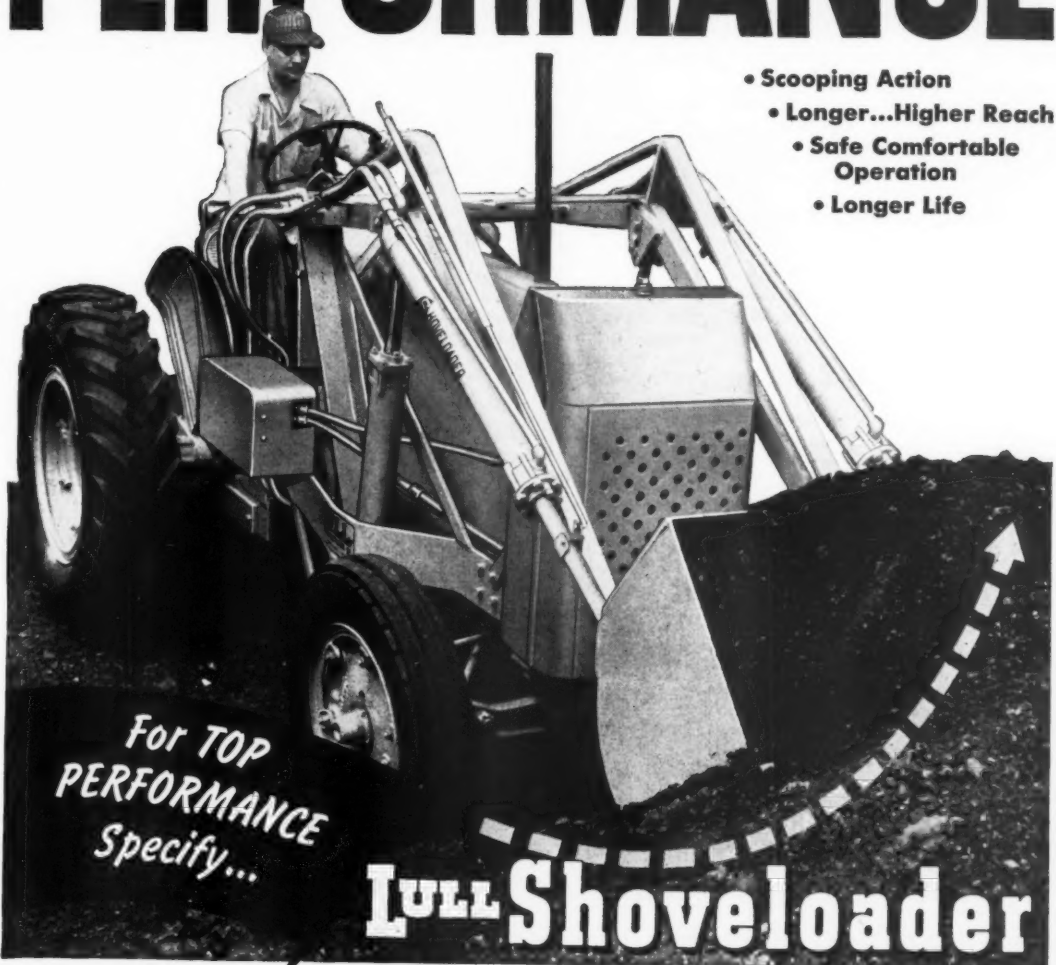
Write for prices and information.



MADSEN IRON WORKS, INC.
P. O. BOX 589 • HUNTINGTON PARK, CALIF.

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LULL SHOVEL LOADERS are specially engineered to mount on and utilize the full power of industrial wheel-type tractors.



C. & E. M. Photos

Big overhead doors in the east and south walls of Slaterry's maintenance shop at Maspeth, Long Island, roll up to permit entry of even the largest equipment.

Equipment Serviced In New Modern Shop

Contractor's Headquarters Include Two New Buildings
Where Repairs Are Handled by Own Maintenance Division

• THE Slaterry Contracting Co., Inc., of New York City is a strong exponent of a contractor handling his own maintenance and repair of equipment. Headquarters for the company are at 46-36 54th Road, Maspeth, Borough of Queens, where two modern buildings house the offices, garage, and shop of the contractor's Maintenance Division. Each building has 100 x 100-foot overall dimensions, and all are enclosed within a 400 x 400-foot yard by a woven-wire fence.

Beyond the fence and south of the yard is considerable acreage which the company uses to store fill. Material spoiled here from excavation jobs is thus available for use on some other project where fill may be required. Slaterry moved to these new quarters, built for and by the company, in August, 1950, from its previous location in Woodside, Queens.

The contractor's site is at practically the geographical center of New York City, where one might naturally expect a densely populated area. But this

part of old Maspeth lying north of the headwaters of Newtown Creek, the Brooklyn-Queens boundary line, is given over to an unusual assortment of land uses including cemeteries, industrial sites, vintage homes, and extensive acreage of marginal ground. From Slaterry's viewpoint the location is ideal. There is more than enough land available for storage of construction materials and an impressive array of equipment. All of the city's five boroughs are easily reached, with Manhattan only a few minutes away via the Queens-Midtown Tunnel which has an approach highway through Maspeth.

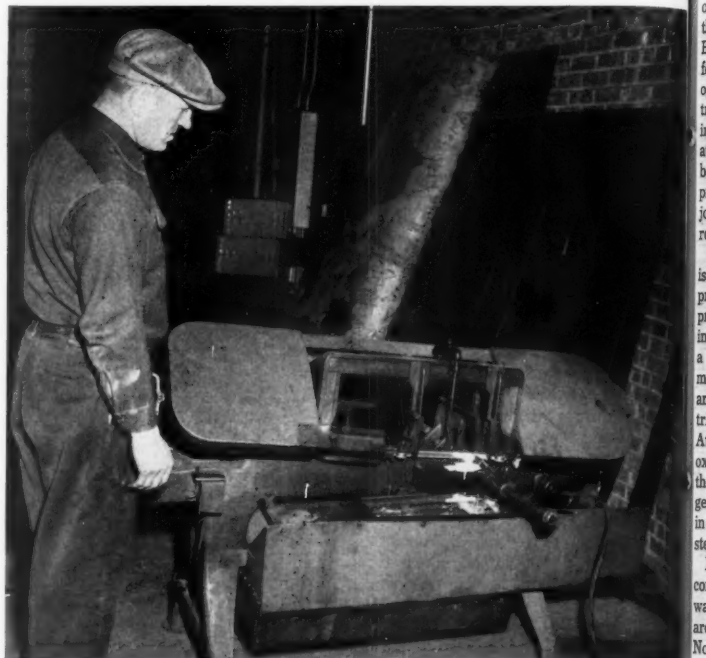
Busy Contractor

This central location is a distinct advantage to the Slaterry firm which at present has some 22 contracts under way in the New York City area alone. Projects are primarily in the heavy and building fields, either as general contractor, subcontractor, or working with others on a joint venture. Slaterry has

(Continued on next page)



But before any piece of equipment is repaired or serviced it is steam-cleaned out the yard. Here a Chicago Pneumatic gets the treatment from a Chem-Therm cleaner.



Inside the shop, a Kalamazoo metal-cutting saw cuts a piece of angle iron.



In the garage a couple of Fretsch's men pump fuel into a Mack truck.



And here a Sioux 1/2-inch portable electric drill puts a hole in a piece of angle iron.

specialized in excavations, foundations, and concrete work. Current local activities include the East Side Air Lines Terminal; New York University-Bellevue Medical Center; United Nations Headquarters; and a large public-housing development in the Bronx.

Outside of New York, Slattery is engaged on one of Pittsburgh's new skyscrapers, and on the construction of Fairless Works, U. S. Steel Corp.'s all-new plant at Morrisville, Pa. On the latter project the Queens firm is teamed up with the Walsh Construction Co. of Davenport, Iowa; B. Perini & Sons, Inc., of Framingham, Mass.; and S. J. Groves Contracting Co. of Minneapolis, Minn.

The firm has been in the contracting business for nearly 30 years, and is headed by James M. Slattery, President. Company offices are in the two-story red-brick wing at the west end of the garage where trucks are stored and serviced. Overhead doors in the north and south walls open on the street and yard respectively.

Maintenance Division

West of the office is the Maintenance Division building, a steel, concrete, and brick structure that is fireproof throughout. The main portion, given over to the repair shop, has a 22-foot ceiling. Big overhead doors, 18 feet high x 16 feet wide, in the east and south walls open into the yard, and permit the entry of the largest piece of equipment into the shop. A central-heating plant, at basement level, contains a Fitzgibbons boiler with a Petro oil burner that provides heat for both buildings. Adjoining the shop is a shower and locker roof for the maintenance personnel.

On a shelf in one corner of the shop is a pair of Ingersoll-Rand 5-hp compressors which supply air at 160-pound pressure for the various air tools used in the shop. Other equipment includes a Manley 60-ton press, a Kalamazoo metal-cutting saw that can go through an 8-inch shaft; and several Sioux electric tools such as drills and grinders. At one end of the room is the K&G oxyacetylene welding equipment and the accompanying Linde tanks of oxygen and gas. Genex electrodes are used in arc welding, and P&H with stainless steel.

In the garage there is another I-R compressor, up on a shelf out of the way. Underground along the yard side are the fuel and oil tanks. Standard Oil No. 2 high-speed diesel fuel is stored in two 2,000-gallon tanks, with similar storage facilities also for gasoline. RPM motor oil is kept in three 550-gallon tanks. Equipment is serviced with RPM lubricants used in Balcrank grease rigs. Sections of the garage are also used for storing plywood, steel, and rubber tires—the last either General or Firestone.



C. & E. M. Photo

In the shop yard a Hughes-Keenan yard crane picks up a Page 1½-yard drag bucket.

Servicing the Equipment

Equipment is serviced by a crew of ten mechanics and three welders un-

der the supervision of Charles "Dutch" Pretsch, Master Mechanic, who has been with Slattery for 25 of his 43

years. According to the stocky square-jawed Dutchman, practically every kind of repair to the construction machinery is made here in the shop, only crankshafts being sent elsewhere for regrounding. When a piece of equipment is in need of service or repair, it is sent in from the job and replaced by another unit.

With a small item, say a storage battery, this exchange is simple. The battery is renewed on a Willard charger and held until it is needed some place. With heavier pieces of equipment, low-bed trailers pulled by Mack tractors are sent out to bring in the machine. Slattery has built his own heavy I-beam trailers for special-purpose work with utility companies, and employs these in transporting equipment.

Major pieces of construction machinery in the Slattery lineup include: 3 Thew-Lorain 820 2-yard shovels; 2 Northwest 80-D 2½-yard shovels; 2 Northwest No. 6 1½-yard draglines; 13 truck cranes, of which there are 11

(Concluded on next page)

GENERALS

do any job, anywhere—
**FASTER! EASIER!
AT LOWER COST!**



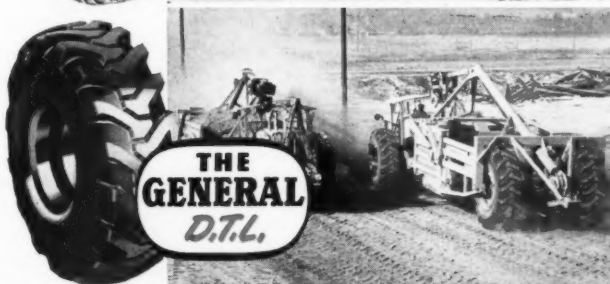
GENERAL L. C. M.

For most work off the road, some on. Broad, deep lugs and thick, rugged shoulders prevent cuts, snags, bruises. More rayon cords, more rubber for extra carcass strength.



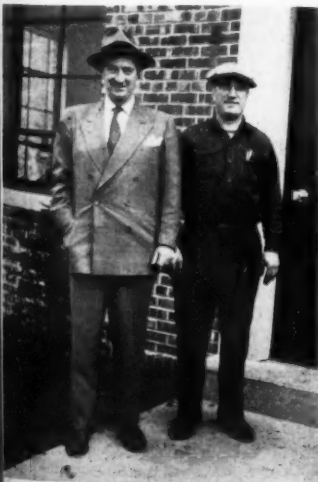
GENERAL H. C. T.

Designed for most work on the road, some off. Long-wearing safety tread and reinforced shoulder cleats give more traction, more original and recap miles.



GENERAL DUAL TRACTION LUG

To move more yards of dirt, the General Dual Traction Lug digs deep for more traction in soft going, forward or backward. Makes heavy jobs easy.



C. & E. M. Photo

Master Mechanic Charlie Pretsch, at right, has been with Slattery for 25 years. With him is Purchasing Agent Jack Flanagan.

Make Every Worn Tire Work Longer for More Profit!

**Your General Tire Dealer will KRAFT SYSTEM RECAP Worn Tires
with the New General Truck Tire Tread of Your Choice**



You're throwing away money when you throw away worn tires or accept an ordinary "adjustment" for them. Let your General Tire Dealer—a tire expert—restore worn tires with famous factory controlled Kraft System

Recapping. You choose from the complete line of on and off-the-road new General Tire treads and he'll put that tread on your worn tire. He can do sectional repairs too. Get Kraft System Recapping—get more profit from every tire.

SPECIFY GENERAL TIRES ON YOUR NEW EQUIPMENT



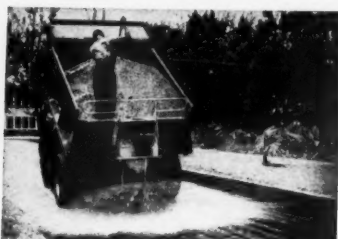
MODEL R HI-WAY SPREADER

Here is the Spreader that outperforms all others, as proved by actual field tests and on-the-job figures!

Use it for any type of aggregate from fine sand to crushed stone. It will spread forward or reverse, with control of material flow. By using baffles, you can control the width of the spread from one foot to the maximum. You'll be amazed at Model R's record of operational economy. Available in sizes from 8' through 13'.

Sold by leading distributors throughout the U.S., Canada and many foreign countries

HIGHWAY EQUIPMENT COMPANY, INC. CEDAR RAPIDS, IOWA, U.S.A.
MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS



MODEL DD TAILGATE SPREADER

Here is the economical all-purpose, all-weather Spreader—used in the summer for dust control and for seal coating, and in the winter for spreading sand, cinders or rock salt on icy pavements.

Model DD fits any standard dump truck body and can be attached or detached in one minute. It gives a uniform spread 4 to 60 feet wide, at 1 to 35 miles per hour. Model DD will give you years of economical, trouble-free service.

Equipment Serviced In New Modern Shop

(Continued from preceding page)

Lorains, 1 Northwest, and 1 Koehring; 2 Hough HM Payloaders. Of the excavators, the Lorains are powered by Caterpillar D13000 diesel engines while the Northwests are equipped with Murphy diesels.

The contractor has 18 D7 and D8 tractors, a Caterpillar No. 112 motor grader, and an Allis-Chalmers Model 20 shovel-dozer. Drilling equipment takes in a good assortment of Ingersoll-Rand, Worthington, and Gardner-Denver wagon drills and jackhammers, together with a Joy Quarry Bar. Air for these units is supplied by 5 I-R, Worthington, or Chicago Pneumatic 500-cfm compressors, 2 Le Roi 600-cfm compressors, a 315-cfm Chicago Pneumatic on a Ford truck, and a 500-cfm Gardner-Denver on a Mack. For use with the drilling equipment there are 6 Kadco dust-control units.

Hauling is done with a fleet of Mack, LJ or NR, 10-wheel diesel trucks, 8 Ford F8 dump or flatbeds, and 10 Ford pickups. For welding there are 5 Lincoln, Hobart, or P&H 300-amp machines, while the pumping equipment includes 35 Marlowes from 1½ to 12-inch in size. Shovel buckets are Ames clamshells are Hais or Owen, and the drag buckets are Page.

Man and Machines

When equipment reaches the yard or any one of the four large transport trailers, it is unloaded by perhaps a truck or crawler crane that is on hand or else by the all-purpose yard crane. The latter is a Hughes-Keenan Rous about crane with a 7½-ton lift. "Dudley Pretsch redesigned this machine, substituting a ¾-inch for the ½-inch cable and adding a counterweight at the rear. The changes now permit the crane to handle easily 9 to 10-ton loads.

Slattery's Master Mechanic is not only to accept a manufacturer's piece of equipment as is, if he can improve it to serve better the contractor's specific needs. He redesigns and rebuilds cabs and bodies for trucks, puts on different and sturdier bumpers, ever aiming to make a machine that will be stronger and last longer in the punishing work meted out by a contractor.

Even the A-frames or gantries on the Northwest machines have been modified to the contractor's own specifications. Pretsch takes satisfaction in the fact that other contractors have copied his adaptations, and redesigned their rigs after his ideas.

Nothing is discarded, either, because of age, if it can still be put to use. The day we were on hand the maintenance man had overhauled an old Ford gas-distribution truck that had been through many years of hard service. "I'm pensioning off this machine," Pretsch said, grinning. "But it can still do a good job carrying around the Chicago Pneumatic compressor I'm mounting on its flat bed." Before that was left the shop, heavier side plates were also put on the compressor to give increased rigidity.

Clean Them First

Before a piece of equipment is repaired or serviced, it is first given a thorough cleaning out in the yard with a Chem-Therm steam cleaner using Magnus 23-X soap powder. "That's a big improvement over the old way of used to clean with gasoline," Pretsch pointed out. "We don't get chapped hands anymore, and whatever it is we're working on is really cleaned. It also dries rapidly so that we can move it into the shop and start in on the repairs immediately. The machine burns clean, too, and has no objectionable fumes."

Within the shop the well-trained maintenance crew does its job quickly and efficiently in pleasant, orderly surroundings. Necessary repairs are made, cables are replaced when needed with Jones & Laughlin wire rope, fittings are lubricated, and once more the machine is loaded onto a low-bed trailer to be returned to the job.

Future plans for the Slattery Contracting Co. layout in Maspeth call for the construction of a modern stock room, 40 x 100 feet, at the rear of the maintenance shop, to replace the existing frame storage structure. Like the two other buildings, it will be of the latest design and construction.

Ryerson Holds Open House

To celebrate a large addition to the St. Louis, Mo., plant of Joseph T. Ryerson & Son, Inc., steel distributor in Chicago, Ill., the company held open house at the plant last June. John Acee, Plant Manager, was host, and some 2600 guests were shown over the new facilities and afterwards entertained at dinner.



.... to help fight
the strongest foe in
the world—cancer.

Who is he? He is any generous person giving freely to the American Cancer Society's Cancer Crusade.

He believes that the light in the "lab" must not be extinguished... that his fellows must learn to recognize the symptoms of cancer and the need for early diagnosis... that more doctors, nurses and research scientists must be trained.

A victory against cancer now may mean protection for you later. Won't you help us by giving freely—giving generously—giving now? Mail your contribution to "Cancer" care of your local post office.

Help us fight your battle
Give to the
Cancer Crusade of the
**AMERICAN
CANCER SOCIETY**

for a high lift...
and finger tip control



DIGGING AND LOADING is easier with the extra power, high lift and easy maneuverability of a Reese hydraulic Loader.

Operators like its six shuttle speeds... its bucket-angle indicator... and its automatic maintenance of the set bucket angle throughout its total lifting ranges. They like, too, its floating bucket action which permits the bucket to follow the ground contour when digging.

Reese hydraulic Loaders are built in two sizes for Minneapolis-Moline Tractor Models UTIL and RTI. Ask to see their many special features at Minneapolis-Moline dealers or write for catalog.

REESE ENGINEERING CO. • 9517 Rush Street • El Monte, California

MORE DIGGING POWER is built into the Reese Loader with oversize double-acting hoist cylinders.



VARIETY OF USES Reese Loaders are adaptable to a variety of jobs; have fork lift, job boom, back-fill blade and many other attachments.

REESE Hydraulic Loaders

Yours for the Asking

An extra set of tear sheets of any CONTRACTORS AND ENGINEERS MONTHLY article you may wish to file for future reference.

Our Reader Service Dept. will send such articles pasted on standard file size sheets if you request it.

Australia's First Construction Fair

Australians have reason to congratulate themselves on the success of their first Construction Industries Fair and Convention which was held in Sydney last April (see C. & E. M., March, 1952, pg. 99). The fair, which was run along the lines of the ARBA Road Shows, featured Australian-made machines only, but most of these were produced in Australia under license from American companies. Over 50,000 people inspected the \$3,000,000 machine display, including such distinguished visitors as the Governor-General of Australia and the Governor and Premier of New South Wales. Apart from the construction machinery itself, great interest was shown in the exhibition arranged by certain government departments of models and illustrations of national works under construction in Australia.

At the 3-day convention from April 7 to 9, the speakers included the Honorable J. J. Cahill, Premier of New South Wales; Sir Douglas Copland, Vice Chancellor of the Australian National University; Dr. F. W. G. White, Chief Executive Officer of the Commonwealth Scientific and Industrial Research Organization; Robert O. Lloyd, past President of the National Federation of Building Trades Employers of Great Britain and head of a team that went to the United States to study production methods; M. R. Hornbrook, Managing Director of M. R. Hornbrook Pty., Ltd., contractor, and Vice President of the Australian Institute of Builders; and Brigadier C. Cameron, Managing Director of Port Jackson & Manly Steam Ship Co., Ltd.

Their addresses ranged over the economic implications of public works for national development in Australia; the application of science to construction; methods to increase productivity; the use and care of machines on construction projects; and water transportation. A construction clinic was a popular item and comprised a series of short discussions on such problems as dewatering; communications on construction jobs; safety; cranes and hoists; rock excavation; soil treatment for foundation; open-cut coal stripping; tunneling; and equipment utilization.

New Roller Chain Is Self-Lubricated

A roller chain incorporating oil-impregnated sintered metal bushings has been introduced by Whitney Chain Co., Hartford, Conn. Advantages are that it requires little or no lubrication and will operate where conventional lubrication methods are either not possible or undesirable, the company says. For example, chain drives are often employed in areas containing considerable grit or abrasive material, and under these conditions, they have to be operated without lubrication of any sort, as external oiling of the drive results in a materially decreased service life.

In a recent laboratory test a $\frac{5}{8}$ -inch-pitch oil-impregnated sintered bushing chain and a $\frac{5}{8}$ -inch-pitch standard roller chain, prelubricated to the best practice, were installed on 19 and 45-tooth sprockets having a center dis-

tance of 8.75 inches. The two chains were then run under a 10-hp load at 1,900 rpm. At the end of 20 hours of operation, the standard prelubricated roller chain showed wear or elongation of 0.380 inch while the oil-impregnated sintered bushing chain showed 0.080 inch. This indicated an increase of several hundred per cent in anticipated service life.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 442.



At the Sydney (Australia) Construction Fair, left to right: Dr. T. H. Upton (behind the boy), President of the Sydney Water Board; A. A. Losch, General Manager of LeTourneau (Aust.) Pty., Ltd.; Sir William McKell, Governor General of Australia; and G. W. Thomson, General Manager of Tutt Bryant, Ltd. That's an Allis-Chalmers HD-20 equipped with a LeTourneau Angledoser in the background.

Truck-Mixer Information

A bulletin available from Chain Belt Co., 4666 W. Greenfield Ave., Milwaukee 1, Wis., covers the Rex Moto-Mixer. This truck mixer is made in 5½ and 7-yard models; it features flexibility in mounting, flexibility of truck choice, water tank over cab, and end loading with closed rear end.

The literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 412.

LOADS OF OVER 25 TONS LIFTED HIGH AND DRY

THIS

Powered

AMERICAN CRANE

Helped Omaha Roll
with the Punch!

*** MM 403-4A**

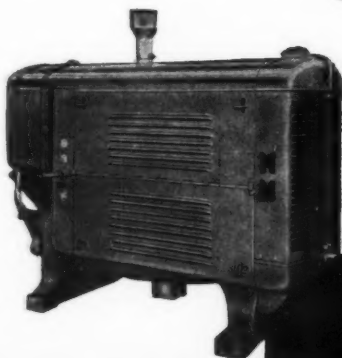
POWER UNITS DELIVER
"AROUND-THE-CLOCK"
DEPENDABILITY ON AMERICAN
MODEL 375 TRUCK CRANES

Ol' Man River's Punch

was met with preparedness when flood threatened devastation to Omaha's industrial area. The city's disaster committee made arrangements for moving of equipment to minimize loss. MM powered American Cranes were called into service and "not a single American Crane, working around the clock, had to stop or slow down for any reason."

Manufacturers of heavy equipment know that the success of their unit often depends on the power unit. That's why more and more of them select MM economical, low-speed, high-torque power units of proved dependability. Can you afford to settle for less?

See Your MM Dealer Distributor or Write



MINNEAPOLIS - MOLINE
MINNEAPOLIS 1, MINNESOTA

Vulcan Tools

Rock Drills, Pavement Breakers and
Clay Diggers

Vulcan Tool Manufacturing Co.

35-42 Liberty Street, Quincy 69, Mass.
Branch Offices and Warehouse Stock:
74 Murray St. 34 No. Clinton St.
New York 7, N. Y. Chicago 6, Ill.

Send for catalog or see your local distributor.

New Side-Dump Bodies

A new line of side-dump truck bodies for heavy-duty applications is announced by The Galion Allsteel Body Co., Galion, Ohio. The Roll-Overs are available in many sizes and capacities. They are entirely mechanical in operation, can dump either right or left, and can be mounted on all standard trailers.

The self-contained subframe consists of three heavy box-type outrigger cross members. Front and rear outriggers are built with a series of gear-like teeth which roll inside the formed channel tracks welded to the body. This construction locks the body in a stationary position and is said to prevent its forward or backward movement on the subframe.

The main locking mechanism is a down-pull spring-loaded-type plunger pin which engages in a socket that is built into an angle welded to the head of the body. The lock pin is actuated by a lever mounted on an A-type frame



The Galion side-dump body, the Roll-Over, is entirely mechanical in operation and can dump right or left. It can be used as a single unit or in "trains".

welded to the front of the subframe. The lever can be operated from either side of the body.

For dumping, the driver disengages the spring-lock chain on the side of the body opposite to that from which the load is to discharge, then releases the plunger lock lever. Bodies can be

righted manually or by a slight snaking movement of the truck.

In addition to their uses as single units, Roll-Overs can be employed in "trains" by installing one or two bodies on a trailer, and a third or fourth on an attached dolly trailer. With the "train" system, more than 50 yards of

material can be handled with one tractor, the company states.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 476.

Bulletin on Drill Bits

A bulletin on a line of drill bits is offered by Mackintosh-Hemphill Co., 901 Bingham St., Pittsburgh 3, Pa. Throwaway bits are not threaded or locked to the drill rod. The bit socket is placed on the drill rod, twisted slightly, and then forced on by striking on a hard surface. A pull-off force of about 20,000 psi can be attained with a knock-off tool.

The bits are blunt, with hardened cutting edges. Wide channels between cutters and large overhang are said to provide fast and clean drilling. Models are made with a large center or side hole to minimize plugging.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 427.

Why Good Pipe Fitters Choose

RIGID

4P Geared Pipe Threader



No. 4P, 2½" to 4" pipe

Extra easy to carry and put on pipe

- ★ Balanced loop handles—easy to swing 4P where you want it.
- ★ Mistake-proof workholder sets to size *before* put on pipe—only one set screw.
- ★ Practically no upkeep—drive pinion in oilless bronze bearing; safe enclosed gear.
- ★ 4 sets of 5 high-speed steel dies for 2½", 3", 3½", 4" pipe. Ratchet handle; RIGID Universal Drive Shaft available. Also special 4P for conduit.
- ★ Buy efficient 4P at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO



Hard-Surfacing WELDING ELECTRODES



STULZ-SICKLES CO.

SOLE PRODUCERS 92 N. J. RAILROAD AVE. NEWARK, N. J.

- REDUCE Maintenance Costs!
- REDUCE Down-time!

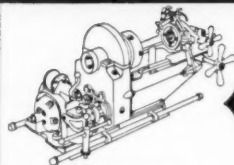
A single pass of SEACO allows parts to workharden and therefore last longer. It takes the toughest impact and abrasion—much longer than many of the more expensive brands. SEACO gives you more for your money, too—only 5% coating and 95% metal. Use SEACO over MANGANAL 11% - 13½% Manganese Nickel Steel build-ups. SEACO makes MANGANAL last up to 50% longer! Try it on your next job!

FREE

Literature on latest methods for speedy and economical repair of worn equipment.

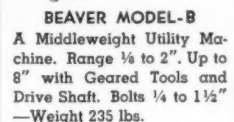
NEAREST DISTRIBUTOR UPON REQUEST

BEAVER—gives you a choice of 4 PIPE and BOLT MACHINES



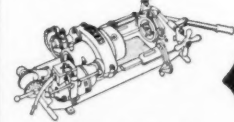
BEAVER MODEL-A

A rugged, Heavy-Duty Machine. Range ½ to 2". Up to 12" with Geared Tools and Drive Shaft. Bolts ¼ to 2"—Weight 365 lbs.



BEAVER MODEL-B

A Middleweight Utility Machine. Range ½ to 2". Up to 8" with Geared Tools and Drive Shaft. Bolts ¼ to 1½"—Weight 235 lbs.



BEAVER MODEL-E

A Lightweight Portable Machine. Range ½ to 2". Up to 8" with Geared Tools and Drive Shaft. Bolts ¼ to 1½"—Weight 185 lbs.



BEAVER MODEL-CI

A sturdy little Power Drive that converts Hand Tools into Power Tools—Range ½ to 2". Up to 8" with Geared Tools and Drive Shaft. Bolts ¼ to 1½"—Weight 140 lbs.

Write for NEW Complete Catalog!

BEAVER PIPE TOOLS, 258-301 DANA AVE., WARREN, OHIO

Convention Calendar

August 21-24—Seabee Convention
Annual National Convention, Seabee Veterans of America, Schroeder Hotel, Milwaukee, Wis. Convention Chairman, Clay Frick, 815 W. Wisconsin Ave., Milwaukee 3, Wis.

October 20-24—National Safety Congress
National Safety Congress, National Safety Council, Chicago, Ill. Construction Section Meetings, October 21-22, Conrad Hilton Hotel. Howard Warzyn, Staff Representative, Construction Section, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

October 26-November 1—Panamerican Congress of Road Builders
Extraordinary Panamerican Congress of Road Builders, Mexico City, Mexico. Ing. Armando Salinas, Executive President, Organizing Commission, Marconi 2, Desp. 36, Edificio Garantias, Mexico, D. F.

December 9—Concrete Producers Meeting
Eighth Annual Convention, New York State Bituminous Concrete Producers Association, Hotel Statler, Buffalo, N. Y. Gus Rayner, Executive Secretary, Box 667, Albany, N. Y.

Pennsylvania Is Top For 1951 Highway Work

Pennsylvania took an easy first place for 1951 highway construction and maintenance expenditures, according to statistics compiled by the American Road Builders' Association, Washington, D. C.

The Pennsylvania Department of Highways 1951 figure was \$116,059,000 for construction, including state highway and Bridge Authority expenditures. North Carolina came second, with \$99,586,000; Texas third, with \$91,972,927; New York fourth, with \$90,536,000. As regards maintenance, there is Pennsylvania at the top again, with \$32,131,000 spent on improvements, snow removal, and other "housekeeping" details along the 41,000-mile state highway system. Texas is second in maintenance with \$29,274,337; and New York third, with \$27,315,000.

It looks as if it will be the same story in 1952. Estimates for this year show that Pennsylvania's probable expenditures in construction will be \$125,000,000. North Carolina plans to spend \$100,000,000; New York \$95,000,000; and Texas and California \$90,000,000 each. E. L. Schmidt, Pennsylvania Secretary of Highways, said recently that in the past five years his state had averaged more than \$105,000,000 per year for construction, reconstruction, and resurfacing, and last year alone it built 2,365.66 miles of new roadway.

ISEA Annual Election

Industrial Safety Equipment Association, Inc., New York, N. Y., held its annual meeting last June at Hot Springs, Va. Elections included: President: Edison L. Wheeler, Wheeler Protective Apparel Co.; Vice President: S. C. Herbine, Willson Products Co.; Trustees: J. B. Davies, Mine Safety Appliances Co., and F. R. Davis, Jr., Davis Emergency Equipment Co.

Carrying over as members of the Board are: J. A. Brewer, Industrial Gloves Co.; G. M. Glidden, Acme Protection Equipment Co.; and Charles H. Gallaway, American Optical Co., who has been ISEA President for the past two years. Mr. Gallaway has also been elected to the Board of Directors of the National Safety Council and will be able to serve as liaison officer between the Association and the National Safety Council.

William L. Lewis

William L. Lewis, President of the Chicago Pneumatic Tool Co., New York, N. Y., died June 28 at the age of 68. Associated with the company for 22 years, he had served as top executive since 1946.



Fast, smooth cuts and easy blade resharpening are features of the 14-pound-weight power saw.

Precision Power Saw

A new air-powered saw for all types of wood cutting is announced by Wright Power Saw & Tool Corp., 292 Longbrook Ave., Stratford, Conn. The 14-pound saw is equipped with new Universal blades for fast cutting and is said to be easy to handle. It operates from any 60-cfm or larger compressor. There is no kick upon completion of a cut and the blades are forward and away from the operator so that no guards are required, says Wright. This permits an unobstructed view of the cutting line.

The company points out that underwater sawing is one of the important features of the saw. Others include

simplified resharpening, changing, and setting of the blades; and the fact that the saw stops instantly when the throttle is released.

Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No. 468.

Trailmobile Appointments

Two appointments to top sales positions have been announced by Trailmobile, Inc., Cincinnati, Ohio. Joseph O. Young, former Branch Sales Manager, has been named General Operations Manager; and Harry Eyler, former Manager of the company's West Central Sales Division, has been promoted to the post of General Sales Manager. Mr. Young joined Trailmobile in 1931, Mr. Eyler in 1940.

A further appointment is that of Rufus B. Jones, a member of the company's Advertising Department since 1950, to the position of Industry Service Director. In this capacity he will spear-

head Trailmobile's program stressing the importance of better roads to the nation's economy, and will represent the company at national and state conventions in the industry.



"... far as we could go with our steel allotment ..."

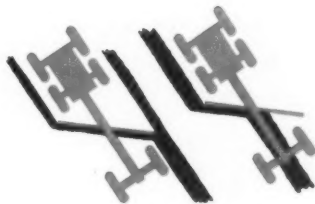


"I take off my hat to All-Wheel Drive and All-Wheel Steer."

Whenever you see an Austin-Western Power Grader with its rear end off-set like this, you can be sure that it is moving more material farther and doing the job faster than an ordinary motor grader could do it. We call it "CONTROLLED TRACTION." Here's how it works:

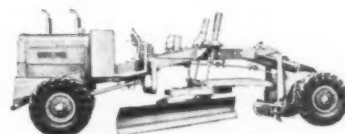
All wheels miss the windrow. The rear drivers push behind the toe of the blade; the front drivers pull ahead of the heel of the blade, and the grader moves straight ahead with a load along the entire blade that would cause an ordinary motor grader to become unmanageable.

PRECISION SIDESHIFT moves the blade in or out, as desired, while the grader is in motion. Ample throat room between top of blade and bottom of circle makes it possible to move a tremendous windrow without interference. The lay-down is handled with the precision that satisfies the most critical engineer.



On the ordinary motor grader, the operator has two alternatives; split the windrow and move less material, or straddle the windrow and not move it the full distance. Each of these procedures slows down the job.

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SINCE 1859—BUILDERS OF CONSTRUCTION EQUIPMENT

How Air-Entrainment Relates Age-Strength

Report by BPR Shows That Age Does Not Cause a Further Reduction in Compressive and Flexural Strength of Air-Entrained Concrete

• THE standard 28-day concrete test shows that initially air-entrainment lowers the compressive and flexural strength of concrete by about 10 per cent. Structural engineers have felt that improved workability, uniformity, and durability make up for this reduction. But many designers have wondered uneasily whether the concrete undergoes a further reduction in strength as it ages.

This question has been answered in an article in the June issue of *Public Roads* by Frank H. Jackson, Supervising Highway Physical Research En-

gineer of the Bureau of Public Roads. Reporting on tests begun as early as 1944, he presents data which show that a 10 per cent reduction in compressive and flexural strength can be expected up to and including 5 years. This is for typical Class A structural concrete (6 sacks per cubic yard and 3-inch slump).

The report also indicates that cements relatively low in tricalcium aluminate develop concretes with higher strengths after a year or more than the higher-percentage cements.

Procedure

Eight portland cements, two from each of four manufacturers, were used. For the purpose of comparison, tests were made without any agent and also with enough neutralized Vinsol resin to produce an air content of about 4 per cent. Standard 6 x 12-inch cylinders for compressive strength, and 6 x 6 x 20-inch beams for flexural strength, were tested. On both types of specimens, determinations were made after 7 days, 28 days, 1 year, and 5 years of moist

storage. Mixing, molding, curing, and testing operations were conducted on 384 specimens in accordance with standard procedures.

Results

In all cases, the tests showed that entrained air lowered strength at each age. Reduction of compressive strength varied from 5 to about 19 per cent, depending upon the cement; flexural strength ranged from 3 to 21 per cent less. The average for both after 5 years was about 10 per cent.

Jackson points out that although a reduction of 20 per cent may seem serious, the air-entrained concrete even in this case gave a value of 4,180 psi, roughly 40 per cent higher than that usually assumed when designing Class A structural concrete.

These reductions, he adds, are based on laboratory tests of carefully controlled concrete mixtures; they do not take into account the improved quality of the field mixtures of air-entrained concrete. Also, non-air-entrained concrete loses considerably more strength under severe weather conditions than air-entrained concrete.

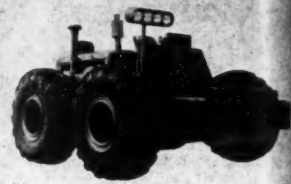
In flexure, the lowest strength was 535 psi at 28 days, somewhat lower than the 550 psi at 14 days used as a design requirement. Here Jackson recommends that where siliceous aggregates, similar to those in these tests, are used in pavement concrete, the cement content should be determined by laboratory test.

With respect to cement composition, the tests show in general that concrete containing Type II cement, although low in early strength, is apt to exceed the strength of concrete containing Type I cement by substantial amounts at later ages.

A New Pusher Unit

A new pusher unit is offered by R. G. LeTourneau, Inc., Peoria 1, Ill. The Tournatractor is a new version of the Super C Tornado dozer with the dozer blade and controls, power control unit, and A-frame omitted. In place of these is a 3 x 15-inch billet, spanning the width of the machine. On the billet is a large pusher plate.

The Tournatractor can be equipped with a torque converter as original equipment and is said to be equally adaptable to pulling operations either with a rear power-control unit or with its drawbar alone. For use as a dozer,



For contractors who use dozers exclusively as pushers, LeTourneau offers this Tournatractor, a new version of the Super C Tornado dozer with a billet and pusher plate instead of a dozer.

the billet and pusher plate can easily be removed and the A-frame; power-control unit, and dozer added.

The Tournatractor is offered with a number of tire choices to meet various job conditions. The manufacturer recommends either 21.00 x 25 or 18.00 x 25 tires for operations in clay, rock or muddy conditions.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 477.

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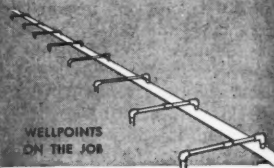
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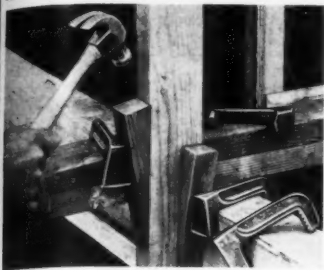
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Wedge-Grip clamps for concrete forms eliminate nails and drill holes. They are said to be rigid and easy to strip.

Concrete-Form Clamps

New clamps for holding concrete forms are available from The Neptune Mfg. Co., 3250 E. Olympic Blvd., Los Angeles 23, Calif. They are light in weight and of one-piece malleable casting. There are no parts to assemble, no nails to drive or pull, and no holes to drill, according to the company. The clamps are said to be rigid and easy to strip.

Wedge-Grip clamps are designed to hold forms on inside and outside corners, columns, panels, beam sides, etc. They automatically grip one timber while wedging another into non-slip position.

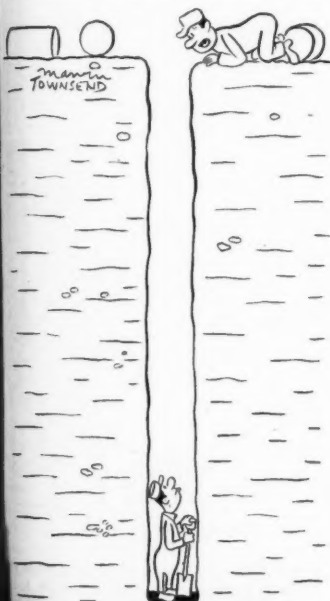
Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 474.

Nordberg Appoints Wenzel

Otto G. Wenzel has recently been appointed Sales Engineer in the Heavy Machinery Division of Nordberg Mfg. Co., Milwaukee, Wis.—with headquarters in New York. Mr. Wenzel has wide experience in the handling and sale of diesel engines; he was employed for some years as Service Engineer to test marine diesels on U. S. Navy submarines; he trained Navy personnel in the operation of submarine diesels; he worked with General Machinery Co. as Works Manager, Diesel Engine Division, and when General Machinery merged with the Locomotive Works of Baldwin-Lima-Hamilton Corp., he became its Eastern Sales Manager, Diesel Engine Division.

Tagline and Dipper Trip

A combination tagline and dipper trip is the subject of a folder offered by Morin Mfg. Co., Inc., 946 Elm St., West Springfield, Mass. The Tag Master is said to maintain control at all bucket levels. It can be operated manually to cast, twist, and snub a



"It's none of my business, but what are you doing with the dirt?"

clamshell or grapple right from the cab. The folder presents owners' comments on the unit's ability to cast without swinging the crane, on its control of the bucket during concrete pours, and on its safety.

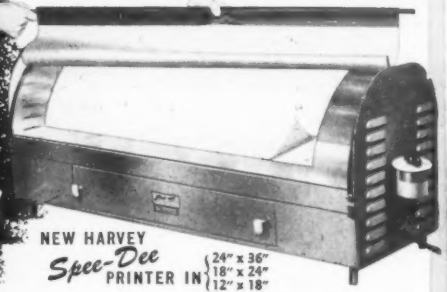
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 446.

Asphalt Institute Promotes

George H. Dent, a senior engineer in the Asphalt Institute, New York, N. Y., has been promoted to the post of Division Engineer. In his new position, he will have supervisory duties over Division I of the Institute's field engineering staff. This division includes New England, the balance of the Atlantic Seaboard states, Tennessee, Alabama, Mississippi, and Louisiana. Five district offices—at Boston, New York, Washington, Atlanta, and New Orleans—will be under Mr. Dent's supervision. Mr. Dent will continue to make his headquarters in Washington, D. C.

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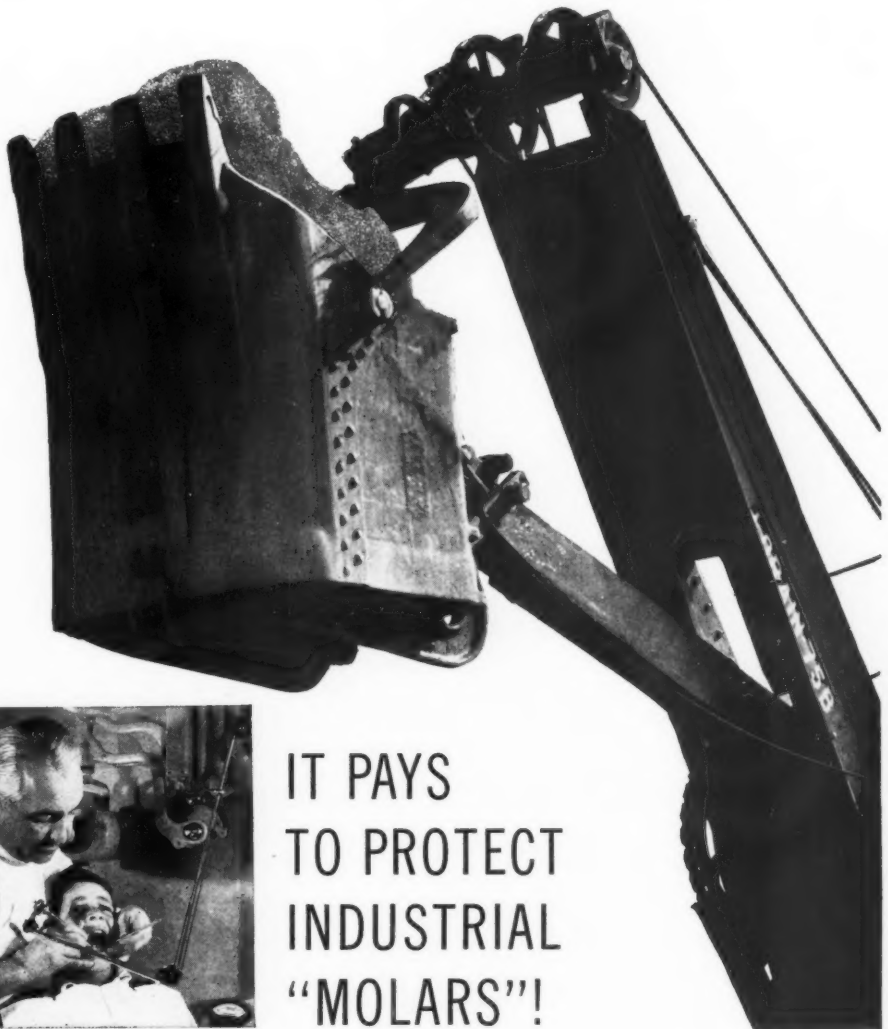


List Price: \$155.81, including initial supply of paper and chemicals. Printer only, \$149.81. Shipping Wt., 85 lbs.

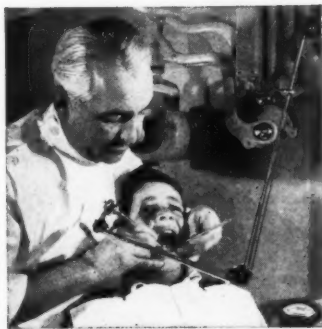
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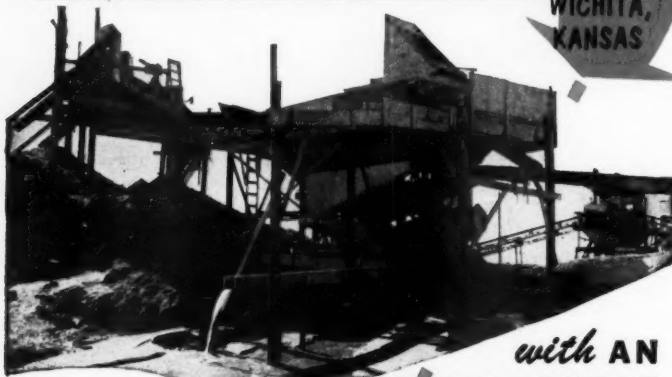
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One dollar is the price of each pocket-size data book in a new series put out by Lefax, Philadelphia 7, Pa. The data cover various engineering subjects such as architecture; building construction and design aids; reinforced concrete; steel forms and shapes; survey-

ing theory and practice. The books, designed for engineers, technical men, students, and business men, contain about 140 looseleaf pages of up-to-date material conveniently arranged for ready reference.

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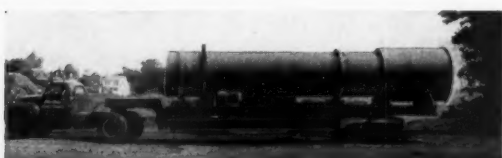
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Approximate Apportionment of Authorizations Under New Highway Bill

State	Primary \$247,500,000	Secondary \$165,000,000	Urban \$137,500,000	Interstate \$25,000,000	Total \$575,000,000
Ala.	5,135,000	3,984,000	1,745,000	\$24,000	\$11,888,000
Ariz.	3,624,000	2,468,000	518,000	370,000	6,980,000
Arik.	4,026,000	3,224,000	745,000	111,000	8,406,000
Calif.	11,177,000	5,757,000	11,837,000	1,141,000	29,912,000
Colo.	4,387,000	2,930,000	1,107,000	448,000	8,872,000
Conn.	1,542,000	794,000	2,579,000	157,500	5,072,500
Del.	1,191,000	794,000	273,000	120,500	2,378,500
Fla.	3,865,000	2,525,000	2,388,000	359,500	9,127,500
Ga.	6,040,000	4,610,000	1,941,000	616,500	13,207,500
Idaho	3,011,000	2,117,000	256,000	307,500	5,691,500
Ill.	9,370,000	5,103,000	9,313,000	956,500	24,742,500
Ind.	5,773,000	3,979,000	3,186,000	589,500	13,527,500
Iowa	5,914,000	4,325,000	1,581,000	603,500	12,423,500
Kans.	5,945,000	4,160,000	1,252,000	607,000	11,964,000
Ky.	4,469,000	3,711,000	1,383,000	456,000	10,019,000
La.	3,755,000	2,720,000	1,952,000	383,500	8,810,500
Maine	2,051,000	1,467,000	257,000	209,500	4,284,500
Md.	2,129,000	1,300,000	2,260,000	217,500	5,906,500
Mass.	3,062,000	1,129,000	5,543,000	312,500	10,046,500
Mich.	7,565,000	4,617,000	6,198,000	772,500	19,152,500
Minn.	6,405,000	4,517,000	2,168,000	654,000	13,744,000
Miss.	3,410,000	2,732,000	3,616,000	443,000	10,203,000
Mo.	7,006,000	4,740,000	3,279,000	715,000	15,740,000
Mont.	4,923,000	3,385,000	314,000	502,500	9,124,500
Nebr.	4,724,000	3,350,000	781,000	482,500	9,337,500
Nev.	3,150,000	2,105,000	101,000	321,500	5,678,500
N. H.	1,191,000	794,000	386,000	120,500	2,491,500
N. J.	3,152,000	1,064,000	5,829,000	322,000	10,367,000
N. Mex.	3,981,000	2,734,000	437,000	406,500	7,558,500
N. Y.	11,422,000	4,575,000	17,799,000	1,166,000	34,962,000
N. C.	5,995,000	5,126,000	1,711,000	612,000	13,444,000
N. Dak.	3,548,000	2,575,000	225,000	362,000	6,710,000
Ohio	8,466,000	5,149,000	7,706,000	864,000	22,185,000
Okl.	5,217,000	3,734,000	1,455,000	532,500	10,938,500
Oreg.	4,178,000	2,919,000	1,068,000	426,500	8,591,500
Pa.	5,548,000	5,682,000	10,081,000	974,500	26,285,500
R. I.	1,191,000	794,000	952,000	120,500	3,057,500
S. C.	3,284,000	2,717,000	916,000	335,500	7,252,500
S. Dak.	3,797,000	2,712,000	259,000	387,500	7,155,500
Tenn.	5,183,000	4,049,000	1,326,000	529,000	11,087,000
Texas	15,736,000	10,535,000	6,380,000	1,606,500	34,257,500
Utah	2,795,000	1,848,000	564,000	285,500	5,492,500
Vt.	1,191,000	794,000	207,000	120,500	2,312,500
Va.	4,625,000	3,593,000	2,077,000	472,000	10,767,000
Wash.	4,033,000	2,694,000	2,009,000	411,500	9,147,500
W. Va.	2,651,000	2,307,000	867,000	270,500	6,095,500
Wis.	5,780,000	4,031,000	2,608,000	590,000	13,009,000
Wyo.	3,033,000	2,055,000	145,000	309,500	5,542,500
D. of C.	1,191,000	794,000	1,150,000	120,500	3,255,500
Hawaii	1,191,000	794,000	448,000	—	2,433,000
Puerto Rico	1,260,000	1,317,000	1,145,000	—	3,722,000

Record Highway Bill Goes Through Congress

The nation's highway system has received record Congressional backing in the recent enactment of an all-time-high Federal-Aid highway bill. For each of the two fiscal years 1954 and 1955, there is a Federal-Aid allocation of \$575,000,000, to be matched by participating states (a breakdown of the state allocations is shown in the accompanying table). A controversial provision to permit the transfer of funds between the secondary and primary systems was eliminated before presentation of the bill to Congress. An innovation is the setting up of a special fund (\$25,000,000 a year) for the development of the interstate system.

Other major items covered in the new bill include: forest highways, \$22,500,000; forest roads and trails, \$22,500,000; park service roads, \$10,000,000; parkways, \$10,000,000; increase for the Baltimore-Washington Parkway, \$1,500,000; Indian roads, \$10,000,000; public-lands roads, \$2,500,000; emergency fund, \$10,000,000; Inter-American High-

way, \$8,000,000; defense access roads, \$50,000,000; Highway Safety Conference, \$150,000; Rama Road, Nicaragua, \$2,000,000.

The new Act constitutes an increase of \$75,000,000 over the Federal-Aid Highway Act of 1950 and is greatly in excess of the \$400,000,000 suggested by the President.

Pfarrer for Morris, Chicago

W. H. Pfarrer, Vice President, Sales and Engineering, for the Morris Machine Works, Baldwinville, N. Y. manufacturer of solids-handling pumps, is now located at the company's Chicago office, 211 W. Wacker Drive. He will take over all sales and engineering in the territory formerly managed by F. S. Salchenberger, who died in June.

MORE CONCRETE BREAKAGE Less man hours!

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Tools begin breaking concrete.

Side view of SABUR POINT

Two inches into concrete. The conventional moll point ends its breaking action. SABUR Point's unique wedge-action continues to shatter concrete.

Six inches in. Conventional moll point is simply cutting a hole. The SABUR Point continues its breaking. Wedge-action permits tool to continue its penetration with tool riding free. Stays sharper 3 to 5 times longer than conventional tool. Will shear reinforced mesh, where ordinary moll point hangs up.

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A complete line of accessories for pneumatic tools

Rear-Wheel Steering Speeds Snow Removal

Idaho Mounts Rotary Plows and V's on Heavier Trucks for Smashing Through Drifts Without Excessive Backing

• BY mounting V-type snowplows and rotaries on heavy trucks which drive and steer on all four wheels, the Idaho Department of Highways has upped snow-removal efficiency markedly in the past five years.

The old days when a rotary operator had to crowd his machine in close, only to have shear pins snap when the pickup mechanism started to operate efficiently, are over. The 4-wheel-steer mounting now lets a rotary operator make one cut through drifted snow with no danger of getting stuck. Many snow fighters in Idaho can still remember vividly the days not too long ago when a rotary never moved into a drift more than the length of the machine. Unless the machine backed up to make a widening cut for maneuvering room, it was soon stuck fast.

"The 4-wheel steering costs a little more initially, but it certainly pays off in efficiency in the long run", explained Norman L. McCrea, Idaho's Maintenance Engineer at Boise. "We are using this type of mounting more and more, and it's more than justified economically."

The type of truck on which the snow equipment is mounted is the standard heavy-duty multiple-wheel-drive made by such outfits as FWD, Coleman, Marmon-Herrington, Oshkosh, and Walter. As a matter of fact, all of these makes are represented in Idaho's snow fleet, which is growing steadily bigger with each passing year as better snow-removal maintenance is demanded by the public.

"It used to be that you could let a road snow in for a day or two, and nothing would be hurt", McCrea explained. "Not now. School consolidations have done more than anything else to make 24-hour snow removal a must. On most of our school-bus routes we have to get out and clear the snow away before the first morning bus starts out for the kids."

Snow Sometimes Severe

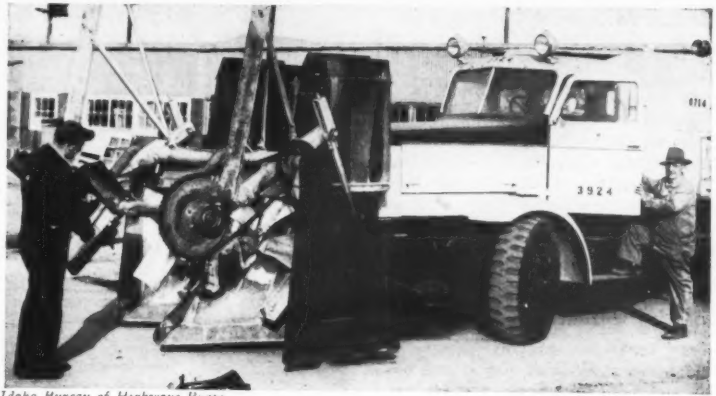
Idaho, like many another state, has winters which can seldom be called "typical". There are times when snow equipment sits idle in a maintenance yard, but, more often than not, there is more snow than the equipment can handle. Idaho has 4,500 miles of state-maintained highways in a variety of topography. There are 20 major mountain passes on the highway system, including such points as Lookout Pass on U. S. 10 on the Idaho-Montana border where snow practically every year exceeds 110 inches. Idaho has glare ice, freezing mist, winter rain, and temperatures which plummet down to 30 below zero.

As a result of these conditions, snow removal has grown from a slow start to today's mechanized radio-directed operation. Today only four passes in the state are allowed to snow in: Galena Summit on U. S. 93, Mores Creek Summit on State Route 21, Wayan-Freedom Pass on State Route 34, and Cave Falls Pass on State Route 47. All of these passes are in back country in seldom-traveled areas.

The winter of 1950-51 was much more nearly normal than the two previous ones. Snow consisted of frequent light storms. By plowing constantly with light equipment, crews removed virtually all the material in time to keep a snow floor from building up on the paved surface. Incidentally, Idaho uses

motor graders to blade snow cake off the pavement. If the floor is too tough for a straight cutting edge, the operators change to a serrated edge to get the job done.

Idaho has a peculiar winter-weather condition, prevalent over most of the state, which can turn a highway into a solid chunk of glare ice in a matter of minutes. Thawing and freezing, or raining and freezing, is common. To combat slippery conditions which always follow, sand is used, principally in pure form. It is stockpiled at con-



Idaho Bureau of Highways Photo

Summertime is the season for snowplow repairs and reconditioning. An FWD-truck-mounted plow gets a thorough inspection.

venient locations, and is spread either by hand from trucks, or by automatic sand spreaders. Where sand is not available, crushed rock and cinders are used. There are very few sand

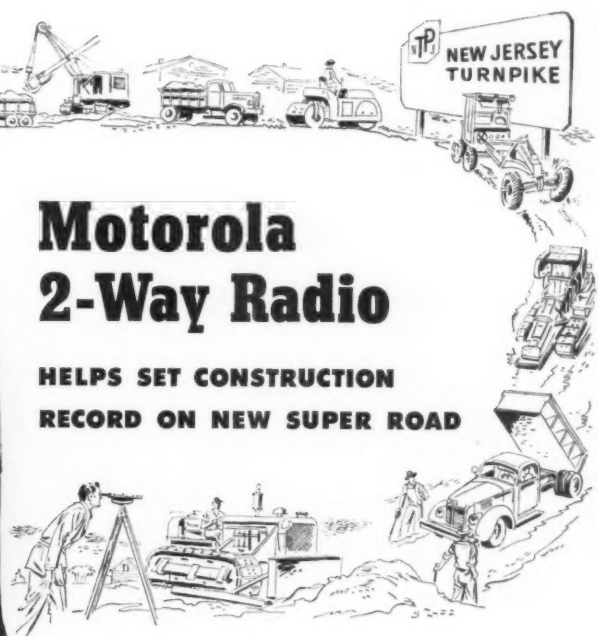
bunkers. Salt has been tried in some areas, and it always helps to prevent the sand from freezing. It also helps to thaw ice on highways.

(Continued on next page)



Motorola 2-Way Radio

HELPS SET CONSTRUCTION
RECORD ON NEW SUPER ROAD



118-MILE NEW JERSEY TURNPIKE OPENED TO
PUBLIC IN RECORD TIME—WITH RADIO COMMUNICATIONS
SAVING TIME AND MONEY EVERY MILE!

In any hard-slugging operation that requires fast, accurate timing of all crews and equipment, look to Motorola 2-way radio as step one in promoting efficiency, economy, and new operational profit!

As an investment, too, Motorola puts first emphasis on your *profit interests*. The equipment is Motorola-engineered throughout to give you the biggest dollar's worth of top performance. It also gives you the protected value of obsolescence-proof equipment that will stay up to date for years to come.

Remember! Motorola is all ways your best buy!



Operational foreman on this major highway project keeps progress report up to date with instant radio communication.



On-the-spot reports, orders and trouble shooting is done direct from the superintendent's car using Motorola 2-way radio.



Motorola base station console with microphone... gives you freedom from obsolescence, low operating cost... outstanding reliability.

Motorola

Communications & Electronics Division
4545 Augusta Blvd., Chicago 51, Illinois
Rogers Majestic Electronics Ltd., Toronto, Canada

Rear-Wheel Steering Speeds Snow Removal

(Continued from preceding page)

Drifting is always a problem, especially in the southern and central part of the state where desert-like conditions prevail. About 750,000 linear feet of woven-slot snow fence was used last year to control snow drifting, and some trenching was also done. In cultivated areas the snow fence has to be removed each spring and replaced again the following fall, so it becomes a costly operation. In late years, new-construction design has taken the snow-drift factor into consideration as much as possible, and more wind-swept sections are planned for the future.

Equipment and Methods

Equipment is spread throughout the 6 maintenance districts, located at Pocatello, Shoshone, Boise, Lewiston, Coeur d'Alene, and Idaho Falls. It includes



Idaho Bureau of Highways Photo

Snogos at work to open Galena Summit on U. S. 93. A yearly spring-cleaning job.

182 light trucks with blade or V-type plows, and 60 heavy trucks with V's and wings. There are 15 truck-mounted rotaries, including 3 Bros and 12 Snogo machines.

Auxiliary equipment to help out includes 54 motor graders of various types, 10 tractors with dozers or V-plows, 31 sanding machines, 3 bucket-type loaders, and 39 front-end tractor

loaders.

Methods generally are patterned after those of most other states which have mountain country and heavy snow. The light trucks are the first line of defense, followed by V's and rotaries as the going gets rougher. Very little additional equipment is rented in a normal season, since it is usually more economical to make moves with State-owned machines.

Costs of snow-removal work vary widely, and while all the mileage is programmed for snow removal each year, nobody can predict very accurately just what will happen until the last pass is cleared in late spring. The 1947-48 season was a normal one, and the cost of snow removal for 4,500 miles of the state highway system ran to \$362,000. The winter of 1948-49 was one of the worst on record, and costs mounted to \$822,000. Another bad season was 1949-50, with \$572,000 expended for snow removal and sanding. The winter of 1950-51 was again

(Concluded on next page)

WAUKESHA



RUGGED POWER...Slick and Smooth!

Dual springs, long guides. Pressure-oiled rockers. Stellite-faced valves and seats.

American Bosch single-hole pinhole nozzles.

Clean-burning combustion chamber removes from outside. Upper half water cooled; lower half air insulated to concentrate heat at throat.

Four non-stick "keystone" rings, top ring chrome-plated. Two flat oil rings.

Built-in oil cooler increases oil and engine life.

Full length water jackets.

Hardened renewable cylinder sleeves test 375-425 Brinell.

Rifle-drilled rods. Oil jets cool pistons.

American Bosch fuel injection pump.

High-capacity outside oil pump.

Hardened camshaft, single forging.

Hardened main and rod journals. Steel-back, triple-element precision bearings, pressure oiled.

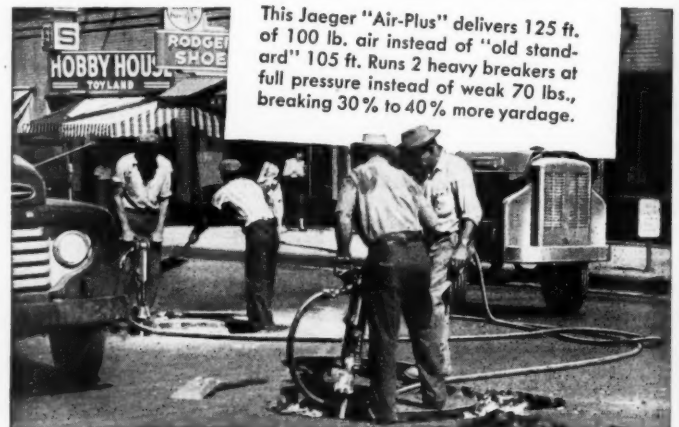
Drop-forged hardened crankshaft. High-speed counterweights not shown.

Alloy-steel heat-treated rod and main bearing bolts.

Model 6-WAKD Super-Duty DIESEL

Six cylinders
6 1/4-in. bore
6 1/2-in. stroke
1197 cu. in.
peak hp 224
@ 1600 rpm.
Send for
Bulletin 1415

You Can Do 4 Days' Work in 3 with "New Standard" Jaeger Compressors



This Jaeger "Air-Plus" delivers 125 ft. of 100 lb. air instead of "old standard" 105 ft. Runs 2 heavy breakers at full pressure instead of weak 70 lbs., breaking 30% to 40% more yardage.

75 ft. 30% to 40% increases in production are yours with any "new standard" Jaeger from Model 75 that holds full pressure in a heavy pavement breaker up to Model 600 that runs 2 heavy wagon drills at full pressure with air to spare for hand-held drills. Jaeger Compressors deliver this 15% to 25% extra air at lowest cost per cubic foot of air of any compressor.

See your Jaeger distributor or write for Catalog JC-1.

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PUMPS • MIXERS • HOISTS • TRUCK MIXERS • PAVING SPREADERS and FINISHERS

Servicised Premolded Para-Plastic* for effective JOINT SEALING

• PARALATERAL Wide Strip

For sealing vertical construction or expansion joints in Retaining Walls, Abutments, Wing Walls, Foundations, etc., particularly when one side will be backfilled and protection from water seepage is necessary. Has rigid backing of asphalt joint material and surface and both edges coated with Para-Plastic, which maintains bond with concrete at all times.

• MOLDED STRIP

Para-Plastic Sealing Compound is molded into strips for sealing of keyed construction joints and cracks or breaks in vertical concrete surfaces. Concrete poured against the strip, after setting up, will bond with strip to form watertight seal.

• NARROW STRIP Pressure Seal

Para-Plastic Pressure Seal is available in both Solid Para-Plastic, and Para-Plastic coated sponge rubber types which are rectangular in square in cross section. Designed for sealing existing expansion joints or contraction cracks in vertical or sloping masonry walls and surfaces.

Servicised Engineers are available for consultation on your joint sealing problems. Write for details and specification data. There is no obligation.

*Para-Plastic is one of the many Patented products developed for the Construction Industry by Servicised Products Corp.

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WAUKESHA MOTOR COMPANY, WAUKESHA, WIS., NEW YORK, TULSA, LOS ANGELES

normal, with an expenditure of \$444,000. The over-all increase in costs between 1947 and 1951 just about reflects the individual cost increases in labor, equipment rental, and supplies.

A New Radio System

A radio network is aiding the snow fighters enormously. It was back in 1949 that Idaho began to invest money in a state-wide radio system. Five base stations and about 50 mobile units are now in operation, and the building has been constructed for the sixth base station. Equipment is either Link or General Electric.

The efficiency of the radio system is best noted during severe storms, because often the operators can call for help when they get into trouble, and units close by can come to their aid. The value to supervisors in knowing at all times the progress and location of equipment is inestimable. Many hours are saved by radio communication when a transfer of equipment to troubled areas is necessary.

During storms, highway conditions change by the minute. Schools, school buses, and the general public now have first-hand information on road conditions. It is also supplied to local radio stations, papers, and motor clubs.

New Load Policy

An aftermath of winter is always the extensive damage done to highways by heavily loaded vehicles, especially when frost leaves the ground after a winter of very little heavy snow. For many years Idaho did the best it could with this problem, particularly with regard to heavy logging trucks which operate on the highway system.

Last year the new Idaho Highway Commission and Chief Engineer E. V. Miller decided to do something positive to protect the investment of public money in a highway plant. A firm, fair policy of load-limit enforcement was formulated and posted all over the state. Its language was clear and to the point. It read:

"It will be the policy of the Idaho State Highway Department to post all state highways requiring protection from heavy loads as a result of weather conditions. These postings will supersede all previous postings and agreements.

"It will further be the policy of the Department not to post any state highway permitting loads in excess of legal



Idaho Bureau of Highways Photo

This is the kind of thing that is death to a frost-weakened highway. An overloaded truck bogs down on a newly thawed road.

limits as defined by Chapters 5 and 217, Idaho Code Annotated, with regard to height, width, length, and weight.

"Checking and weighing stations are being installed at various points throughout the state. All matters necessary to accomplish enforcement will be

effective by January 1, 1952. All operators on state highways affected are hereby notified to make all necessary changes in equipment to comply with the Idaho Code before January 1, 1952.

"It will be the positive policy of the

Idaho State Highway Department to strictly enforce the law in this regard."

It may seem tough, but Idaho's highway officials believe it is necessary to protect the system. Recently Miller said that \$170,000,000 was needed to bring Idaho's highway system up to modern standards, and the protection of what roads the state now has is vital if new construction money is to be spent on necessary projects.

From the extensive mechanization of snow-removal work, the attention to winter load damage, and the new "tougher" enforcement policy, it seems certain that wintertime in Idaho will not continue to be the worst time of the year for the state highway system.

Grating Company's 50 Years

Founded in 1902, Irving Subway Grating Co., Inc., Long Island City, N. Y., observed its golden anniversary last June. The company also manufactures steel-grating bridge flooring and portable runways.

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A manufacturer can now enjoy the benefits of national circulation and editorial coverage while at the same time encouraging local sales and service contacts with his distributor organization. In a highly mobile industry noted for rapid turnover of firms and of personnel, this innovation has been hailed as an important step forward in the marketing of products for construction and highway department use.

Would you like to see what distributors from coast to coast have written us on the subject? Drop us a line or call us at the nearest address shown below.

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TORCHES & LANTERNS

What PAR Is and Does:

An Explanatory Booklet

Project-Adequate Roads (PAR) is an organization devoted to telling as many people as possible what is wrong with the nation's highways, with a view to enlisting their support for a program of correction. In a booklet entitled "PAR—What It Is—What It Does", published by the National PAR Committee, answers will be found to many questions about this nation-wide good-roads movement.

The booklet explains how the PAR

Committee was formed and what it hopes to achieve, and lists the national organizations which are cooperating in its work. It also offers suggestions on how to organize state and local PAR groups.

The booklet is available in quantity on a production-cost basis of 5 cents a copy plus shipping charges. Address your order to Arthur C. Butler, Secretary, National PAR Committee, 952 National Press Bldg., Washington 4, D. C.

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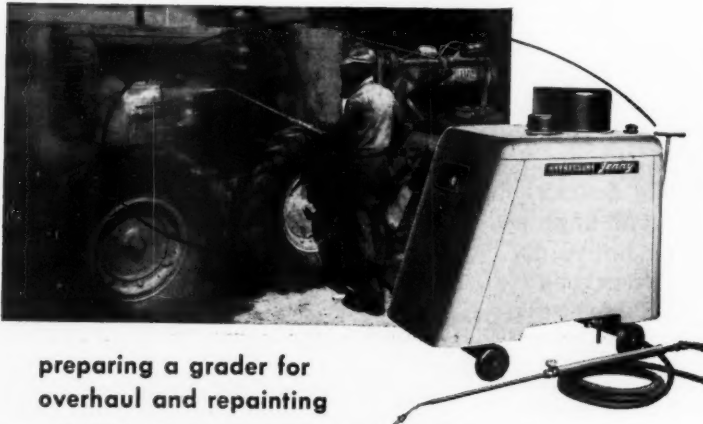
Write for information on Distributor Territories Now Open



The picture shows the Twin Bin operator releasing the weighed material all over the bottom of the mixer skip. You can see the dividing wall of the Stock Bin separating the aggregates. Since most concrete contractors already own a standard wheelbarrow scales, Twin Bin is priced exceptionally low. The loading side of the Stock Bin is 7' high. It can be loaded with clam bucket or small low-priced loaders. The gate bearings to the right and above the operator's head are grease packed and designed to minimize jamming.

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21 man hours
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JENNY will make comparable savings of time and money on any cleaning job... cleans so fast—10 times faster than hand methods—you can strip mud, muck and grease from heavy equipment for thorough inspection, servicing or repairs right on the job if desired. HYPRESSURE JENNY is unmatched for fast and thorough cleaning of bridge and structural work preparatory to painting... cleans brick... tile... stone... concrete... building exteriors... faster and at less cost than by any other method.

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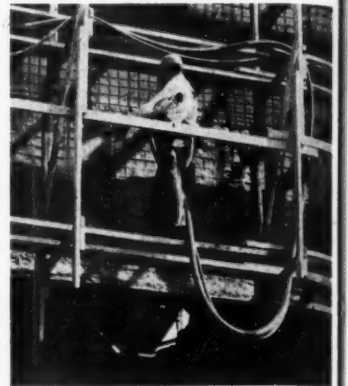


A Gyro-Flow 600 compressor powers two Cement Guns for the Detroit contracting firm of Hanna, Zabriskie & Daron.

Rotary Compressor To Speed Guniting

The pneumatic application of concrete can be speeded up about 25 per cent by the use of a newly developed 600-cfm rotary-type air compressor, according to Harvey Hanna, President of Hanna, Zabriskie & Daron, Detroit Guniting contractor. The firm recently installed an Ingersoll-Rand Gyro-Flow 600 powered by a 6-cylinder GM diesel engine.

Mr. Hanna explains that the compressed-air motor which drives the mechanism of each Cement Gun requires approximately 60 cubic feet of air per minute. With the new 600-cfm compressor, after the demand for two Cement-Gun air motors is met, there remains 240 cfm for conveying the dry cement-sand mixture from each of two guns through the material hose to the point of application. Hence the extra speed. On a recent job involving over 67,000 square feet of 2-inch wall on a high industrial building, progress was consistent at 100 square feet per gun per hour.



Guniting production on the 67,000-square-foot wall job was 100 square feet per gun per hour.

ease, and a 104-hp diesel engine.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 403.

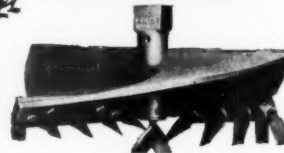
Republic Rubber Promotions

Richard N. Benson, Peter D. O'Neill, and Stephen P. Terlecky have been promoted to the position of field engineers for the Republic Rubber Division of Lee Rubber & Tire Corp., Youngstown, Ohio. These three were the first sales trainees hired under the company's new sales-training program inaugurated in June, 1951. Benson and O'Neill will be with Republic's Chicago district office; Terlecky, with the Philadelphia district office.

THESE PENGU PRODUCTS SAVE YOU MONEY!



THE PENGU EARTH AUGER



- ★ Twin helix—no back thrust!
- ★ Bore true, clean holes in any soil, most sandstones and hardpans, frozen ground, permafrost!
- ★ All wearing parts replaceable on job!
- ★ Made in 15 sizes, 10" to 54" hole diameters, to fit all makes of heavy-duty earth boring machines. Larger sizes on order.

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- ★ Bore where you never could before!
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- ★ All PENGU Augers and Cutting Heads are equipped with the drive-on PENGU Wisdom Tooth, specially designed for use on earth augers; cast from special abrasion and shock-resistant steel alloy for far longer service life!

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MANUFACTURERS

SANTA CLARA, CALIFORNIA

County Gets First Bridge Of Prestressed Concrete

Brown County, Wis., is sold on prestressed concrete. Last June 11, as part of the county highway improvement program, the first deck of Wisconsin's first prestressed bridge was laid in place. Two hours later, traffic crossed the bridge.

The contractor for this bridge and others to follow is the F. Hurlbut Co., Green Bay, Wis., under U. S. Concrete Products Co. license. Highway crews set the abutments for this 18-foot-span bridge. Hurlbut, meanwhile, was pre-casting the nine prestressed decks. These 5-ton decks (3 feet wide x 20 feet 6 inches long) are pierced by 7-strand steel wires. The wires were stretched tight under great pressure, and concrete was then poured around them.

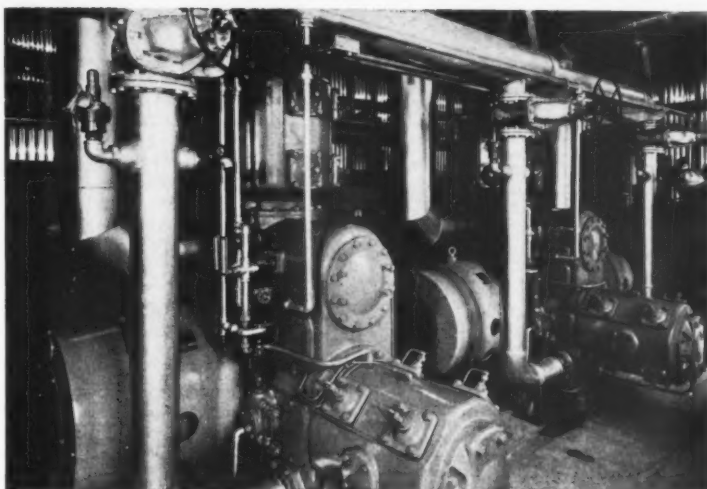
Said Brown County Highway Commissioner, E. F. Brunette, "In comparison to reinforced concrete, these decks are less than half as heavy and use

very much less steel. Steel is hard to get, but fortunately we can go right on with our schedules with a material which is stronger, lighter, quicker to get and to build with, and a lot less expensive. It's a new experience to order a concrete bridge and have it delivered. And it's a new experience to signal traffic across about two hours later."

Bulletin on Applications Of Explosive-Type Drivers

New applications of explosive-type driving tools are illustrated in a bulletin issued by Powder Power Tool Corp., 6705 S. W. Woods St., Portland 1, Oreg. It shows the Drive-It 400 anchoring wooden braces on a concrete bridge, fastening door and window frames, and securing ladders and brackets aboard ship. Safety features of the unit are also described.

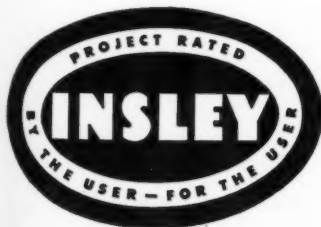
This literature may be obtained from the company, or by using the Request Card that is shown in at page 16. Circle No. 419.



Construction of the 3,400-foot Broadway tunnel in San Francisco requires 4 hoists, 4 muckers, and more than 100 air tools. Power for all these is provided by 3 Ingersoll-Rand air compressors. G-E motors are mounted on the compressor frames and a 6-inch pipe supplies air for tools 4 blocks away.



The **INSLEY** operator knows..

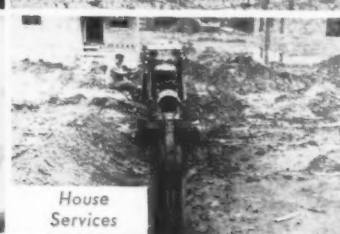
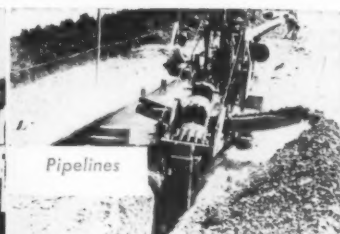


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Distributor Doings

Streamlined Sales and Service

Road Builders Equipment Co., Memphis, Tenn., distributor for International Harvester and other nationally known construction equipment, is going full-steam ahead with a plan for top sales and service efficiency. "Project 1000", conceived by Ernest Higginbotham, late President of Road Builders, and directed by R. A. Baird III, Service Director, has as its aim the development of the company's parts and service departments so that they will be second to none.

Road Builders is not going to be satisfied with telling a customer that a part is not available, even though the company is plagued by the usual lack of storage space. Project 1000 is expected to increase the storage capacity

of the parts area some 30 per cent, by a careful review of stocks to eliminate those items that have not moved in two years, while still maintaining some that are considered critical in spite of slow movement. Other space-stretching methods are the use of dividers to accommodate more small parts in the cubic-inch space of the larger bins; review of parts locations to make the faster-moving items the most accessible; and a complete re-examination of the stock-recording system.

As to service, Road Builders divides this problem into two phases: (a) serving the customer in the field; and (b) serving him in the shop. In order to satisfy customers' needs in both respects the company has decided on decentralization of management and division



This view of Road Builders Equipment Co.'s Parts Department gives some idea of the service customers receive. The two in the photo are being served by Joe Morris (left) and Harold Lowrie (right), Parts Men. R. T. Reddin, Parts Manager, is in the center behind the counter.

of personnel. Mr. Baird has under him a field service supervisor and a shop service supervisor each with his own

staff. A stable organization in the shop is considered to be of the greatest importance. (Continued on next page)



CONTINENTAL'S PILE DRIVING HOSE ELIMINATES COSTLY SHUT-DOWNS!

When pile driving hose "strips" its tube and clogs the hammer-head, the driving operation grinds to a stop. You can prevent these costly shut-downs with Continental's Pile Driving Hose. The tube is "locked" to the carcass. You just can't pull it loose with-

out tearing the hose to pieces. Continental's Pile Driving Hose is an 8-ply, heavy-duty workhorse that stays on the job . . . and helps protect your profit.

Equip your rigs now with Continental's Pile Driving Hose.

PROMPT DELIVERY FROM "NEAR-THE-JOB" WAREHOUSES

To get "right-away" service, call the nearest Continental branch listed below. These warehouses carry large stocks of hose, couplings, boots, clothing and gloves. Get acquainted now with prompt, dependable Continental Warehouse Service.

Rubber by



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Bridge building THE WILLARD WAY . . .



Weigh Batch Loader and Loading Conveyor load and batch aggregates from several locations along eighty-mile stretch of Mohave desert. Batches are hauled by two batch trucks to one of the forty-eight bridges along the lengthy job.

Again—the right mix at the right place at the right time and at the right cost.

Write for the "Willard Way" Booklet.

Willard Concrete Machinery Sales Company
11700 Wright Road, Lynwood, (Los Angeles County) California

STURDILITE The HEAVY-DUTY FLOOD LAMP THAT



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"BUILT to take it," say users of STURDILITE Heavy-Duty Flood Lamps, after years of trouble-free service. Hermetically sealed-beam lamp—no reflector to become tarnished. Complete assembly mounted on rubber cushioned base that absorbs vibration and shocks. Available in 6-8, 12-16, 24-28 and 110-120 voltages.

COMPLETE BULLETIN, specifications, and quantity prices sent promptly upon request.



Metal Spinning Division
PHOENIX PRODUCTS COMPANY
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Distributor Doings

(Continued from preceding page)

portance, as Mr. Baird thinks a customer who brings in his equipment can expect a more efficient job than the one who has repairs done in the field under unfavorable working conditions. For this reason, the greater number of service men operate in the shop, but the field section may draw upon shop personnel in an emergency. For their part, field men, when not fully occupied in the field, work in the shop, or make courtesy calls on customers to offer advice on preventive maintenance and recommend in-the-shop service.

One of Road Builders' most important innovations under the new plan is the employment of a full-time inspector. No machine leaves the prem-

ises without the inspector's signature that it is 100 per cent ready for operation, and an inspection tag will soon be going out with each machine, with a duplicate for the customer's file. Not only does the equipment leave the warehouse in top condition, but a field service man stays at least two days with each machine on delivery. He instructs the purchaser in good operating habits and preventive maintenance and another satisfied customer starts off on the right foot.

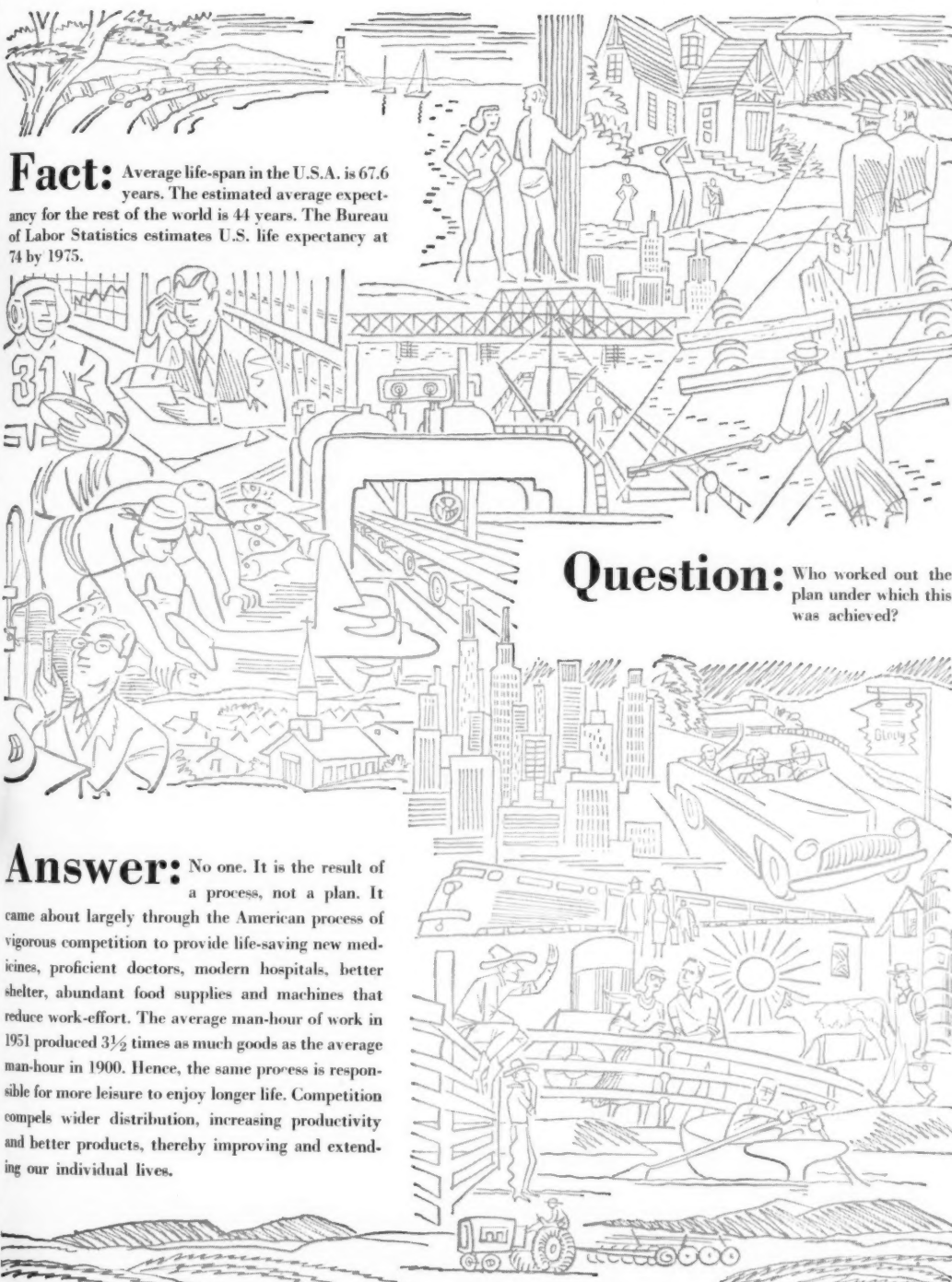
Prompt Delivery to Canyon Customer

It isn't every day that Poole-Krieger Implement Co., Redmond, Oreg., has to make deliveries of construction equipment to purchasers who have to use it at the bottom of a canyon. But that is what happened when Opal Springs Water District, a privately owned concern which furnishes most of the water for Culver, Madras, and Metolius, Jefferson County, Oreg., bought a Caterpillar D4 tractor and bulldozer. The

(Continued on next page)



A section of a Caterpillar D4 tractor arrives at the bottom of Crooked River Canyon after a 1,500-foot trip on a highline. Poole-Krieger Implement Co., Redmond, Oreg., sold the tractor with bulldozer to Opal Springs Water District. When reassembled after its adventurous trip, the machine went to work building a canal.



Fact: Average life-span in the U.S.A. is 67.6 years. The estimated average expectancy for the rest of the world is 44 years. The Bureau of Labor Statistics estimates U.S. life expectancy at 74 by 1975.

Question: Who worked out the plan under which this was achieved?

Answer: No one. It is the result of a process, not a plan. It came about largely through the American process of vigorous competition to provide life-saving new medicines, proficient doctors, modern hospitals, better shelter, abundant food supplies and machines that reduce work-effort. The average man-hour of work in 1951 produced $3\frac{1}{2}$ times as much goods as the average man-hour in 1900. Hence, the same process is responsible for more leisure to enjoy longer life. Competition compels wider distribution, increasing productivity and better products, thereby improving and extending our individual lives.

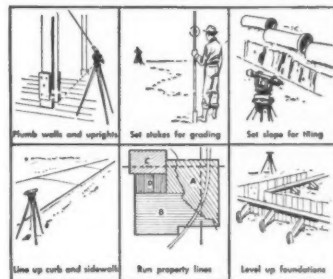
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THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE



White Universal Level-Transit...
most versatile instrument you can own!

Indispensable for these jobs—and many more



ENGINEERS agree: you can do more jobs better — at lower cost — with the White "Universal" Level-Transit. The improved Model 3000 has internal focusing, coated optics, a guarded vertical arc. Plus all the other quality features needed to give you lifetime durability and accuracy. The price: *only* \$185*, complete with tripod. See your dealer, or write DAVID WHITE COMPANY, 313 W. Court Street, Milwaukee 12, Wisconsin.

DAVID WHITE COMPANY

We offer the most expert REPAIR SERVICE on all makes, all types of instruments.

*Price subject to change without notice.

Distributor Doings

(Continued from preceding page)

company wanted to use the machine in the construction of a new canal to divert water from Opal Springs to power new pumps which would increase the gallonage of water pumped out of Crooked River Canyon.

Opal Springs is a pure-water spring of unlimited quantity, gushing from the bottom of Crooked River Canyon, and the distance from the surrounding country to the riverbed is 1,000 feet. To reach it, there is a choice of two routes—a tortuous trail down the cliff, and a highline constructed on a bench 500 feet straight up from the riverbed. On this bench there is a 30-foot highline tower and winch platform, the line covering a distance of 1,500 feet from

the tower to the landing below. Poole-Krieger chose the latter alternative for its tractor-bulldozer, but it meant dismantling the machine into loads of 4 tons or less to correspond with the winch capacity. However, the whole of the machinery was landed in one day, the tractor-bulldozer was reassembled the next day, and promptly went to work on the canal.

Allis-Chalmers Names Four

Four firms have recently joined the distributor roster of Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Emsco Electric Supply Co., 611 W. Grand Ave., Oklahoma City, Okla., has taken on Allis-Chalmers motors, controls, pumps, and transformers in 22 Oklahoma counties. Head of the firm is O. H. Elledge, and T. W. Cline is Sales Manager. Electric Motor Co., 231 Imperial Ave., Calexico, Calif., distributes the same lines, plus Texrope drive equipment, in Imperial County, California. W. N. Glaze is President and his partner is V. L. Easley. Electrical

Equipment Co., 301 W. State Blvd., Fort Wayne, Ind., will serve in the same capacity in Allen, DeKalb, Huntington, Noble, Whitley, Wells, Adams, and Steuben Counties in Indiana. Owner of the firm is A. D. Connelly.

Electrical Supply Corp., 421 Avenue L, Lubbock, Texas, is distributor for A-C transformers in 14 northwest and northwest-central counties in Texas, and in four east and southeast counties in New Mexico. President is G. C. Wasson; E. W. Karnes is Vice President; and Cliff Robinson is Sales Manager.

Two Western Dealers for Waco

Two new California dealers have taken on Waco scaffolding made by Wilson-Albrecht Co., Inc., Minneapolis, Minn. They are: Waco Scaffolding Co., 535 E. Channel St., Stockton, for the Stockton and Merced area; and Laurence Myers & Co., 666 Mission St., San Francisco, for the San Francisco Bay area. Sam Wallach is General Manager of Waco Scaffolding Co., and Jock Hemingway is General Manager of the

separate Waco Division established by Laurence Myers & Co. Both distributor firms will merchandise the entire line of Waco scaffolding, including ground scaffolding, mason and scaffold jacks, material-hoisting towers, and portable elevators.

Browning-Ferris Opens New Branch

Browning-Ferris Machinery Co., Texas equipment distributor, has opened its fourth branch. The new office is at Greggton, Texas, the other three being at Dallas, Houston, and Lubbock. As well as being the latest, the Greggton branch is the largest of Browning-Ferris' offices. It has more than 50,000 square feet of floor space and a spur track for 15 freight cars with facilities for car-door loading. The new plant carries a complete line of parts, with day and night service available, and it maintains two mobile self-contained field units.

L. C. Fuller, Vice President in Charge

(Concluded on next page)

BUILDERS "LINK BRAINS TO THE HANDS" WITH NEW 2-WAY PORTABLE RADIOPHONE



CHICAGO, Ill.—(Special)—A fourteen-pound electronic wonder, the Littlefone*, is small alongside the vast mountains of steel and concrete that go into America's mighty dams, but construction engineers wouldn't part with the Littlefone for its weight in uranium.

"When you've climbed a 200-foot scaffolding on a big dam just once," says a veteran chief engineer, "that's when you'd stop and search the world over for a different answer!"

The answer was the Littlefone, a new, two-way portable radiophone that literally "links the brains to the hands" in construction jobs. Work crews even miles away can keep in constant touch with the engineering offices for split-second decisions that speed work, prevent accidents, and save time and money.

TAKE BUCKETS "OFF ICE"

On an upper Missouri River project, the Littlefone was pressed into service to smooth the flow of overhead cement "buckets"—huge buckets of dripping cement that jammed up "on ice" as the workmen say, at the pouring site. The Littlefone, from the pouring site to the filling point miles away, permitted proper timing—

*Also available in 9½ pound models.

and saved thousands of man hours, and tons of wasted cement.

Throughout industry, the Littlefone extends the "voice of authority" into actual field operations. It patrols huge oil tank "farms" to speed reports on fire safety... it is a partner with railroaders, miners, lumbermen, oil



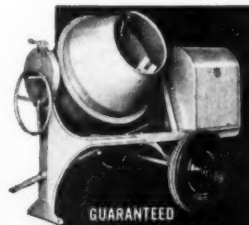
Hand Carry Model

and pipeline workers—helping industry to build quicker, more economically, and with greater safety.

Write today for full specifications—find out how Hallicrafters Littlefone can save you time and money. Write Dept. L-C.

HALLCRAFTERS, CHICAGO 24, ILL.

3 wheelbarrow mixer at 1/3 the cost



Essick 9 cubic foot "One Sacker" Concrete Mixer is the largest portable tilting drum mixer made—three full wheelbarrow loads per batch! It has the full capacity of a skip loader at 1/3 the usual cost! Ruggedly constructed to give years of dependable service... yet so light weight it is no heavier than many 3½-S mixers! Trails easy and easy to use. Equipped with Essick special advantages that make it absolutely the finest big-batch mixer made!

See it at your Essick Dealer or write for information!

ESSICK

Essick Manufacturing Company

1950 Santa Fe Avenue, Los Angeles 21, California
Sales and Service Coast to Coast and in Foreign Countries

GUARANTEED
UNBREAKABLE STEEL
BOWL & YOKE
DOUBLE CUTTING
RIBBON STEEL
MIXING BLADES
SMOOTH RUNNING
TIMKEN BEARINGS
SILENT MULTIPLE
V-BELT DRIVE
RIDE EASY
CANTILEVER SPRINGS
POSITIVE LOCKING
DEVICE holds drum
in any position
ELECTRICALLY
WELODED STEEL FRAME

The New **Scythette** POWER SCYTHE

CUTS WEEDS, GRASS, REEDS

4 TIMES FASTER THAN ORDINARY METHODS

NEW POWER - NEW ENGINEERING

Now equipped with double power, double fuel capacity. Trims weeds on rocky or uneven ground. Cuts grass or weeds close to buildings. Clips off reeds or underwater growth. Cuts with ease wherever a man can walk, wade, or row a boat. Equipped with new two h.p. motor, one quart capacity gas tank, 20" oscillating cutter bar. Weighs only 26 pounds.

a twist of the wrist and the SCYTHETTE becomes the **Sawette**

America's most revolutionary chain saw cuts trees, or any growth up to 6" in diameter, level with terrain while operator is in upright position. Speedy, efficient, rugged, the Sawette is the answer to heavy growth clearing problems.

WRITE FOR FREE LITERATURE

Hoffco, inc. RICHMOND, INDIANA

Distributor Doings

(Continued from preceding page)

of Operations in north and west Texas, is in control of the Greggton office, and Frank Tucker is Manager. Field service representatives are Tex Elmore and S. R. Myszkowski; salesmen are George Harris, Bill Langham, and J. M. Martin.

Brush Aboe Appoints Distributors

As part of a sales-reorganization program, Brush Aboe, Inc. (formerly known as Aboe, Inc.), New York, N. Y., has decentralized responsibility for sales of the Petter small diesel engine and has appointed a number of distributors. Among those already named

to provide sales and service facilities in their districts are: Atlantic Equipment Co., Boston, Mass.; Beland-Cross, Inc., New York, N. Y.; Motor Parts Machine Co., Seattle, Wash.; Shepherd Tractor & Equipment Co., Los Angeles, Calif.; West Coast Engine & Equipment Co., Berkeley, Calif.; and Universal Distributors, Inc., Dallas, Texas.

Petter diesels come in 3 to 36-hp sizes and include two lightweight air-cooled engines developing 6 and 12 hp at 1,800 rpm respectively.

Euclid Midwest Appointments

Two new distributors have been announced by The Euclid Road Machinery Co., Cleveland, Ohio, manufacturer of earth-moving equipment. Cunningham-Ortmayer Co., Milwaukee, Wis., is the new dealer for the state of Wisconsin and Butler-Sparks Equipment Co., Oklahoma City, Okla., will represent Euclid in Oklahoma.

C. G. Ortmayer is President of Cunningham-Ortmayer, which maintains

branches in Eau Claire and Green Bay. Butler-Sparks, which operates a branch in Tulsa, is headed by E. A. Butler.

Walton Equipment Co. Elections

Franklin P. Walton is the new President and General Manager of Walton Equipment Co., Inc., New York, N. Y., distributor of Insley, Gruendler, Wickwire, Ruger, Fageol, Apsco, Miller, and other construction and material-handling equipment. E. C. Homolka was elected Vice President in charge of the Service and Parts Departments at Lodi, N. J.; N. P. Walton, Jr., founder of the company, was re-elected Treasurer; and L. H. Rosoff was re-elected Secretary.

Cleaver-Brooks Appoints Mason

Mason Equipment Co., 2281 Wildwood Blvd., Toledo, Ohio, is a newly appointed distributor for Cleaver-Brooks Co., Milwaukee, Wis., manufacturer of heat-generating equipment. Mason Equipment will cover a territory including nine counties in northwestern Ohio, and the Cleaver-Brooks products it handles will include mobile steam boilers; oil-fired, gas-fired, and combination oil and gas-fired boilers; distillation equipment; hot-water generators; and bituminous heating equipment.

Joy Appoints Florida Distributor

Florida-Georgia Tractor Co., 3139 N. Miami Ave., Miami, Fla., has become distributor in southern Florida for Joy Mfg. Co., Pittsburgh, Pa., manufacturer of stationary and portable air compressors, rock drills, paving breakers, spaders, tampers, and portable hoists. Florida-Georgia employs a 25-man staff of construction-equipment specialists.

Arnold Opens Idaho Branch

Arnold Machinery Co., Inc., Salt Lake City, Utah, has established a branch store in Idaho Falls, Idaho. The company is exclusive dealer in this area for lift trucks, Karry Kranses, and Straddle Trucks manufactured by Hyster Co., Portland, Oreg. Eugene Sandall is Manager of the Idaho Falls branch, and Frank Hoaglund is Sales Engineer.

New Dealership for GMC Trucks

The newly organized Farley-GMC Truck Co., Inc. has taken over the General Motors Corp. truck dealership

at 603 W. 23rd St., New York, N. Y. President of the new distributor firm is James A. Farley, former U. S. Postmaster General, who is also President of General Builders Supply Corp., and a director of several other companies and organizations.

Cummins Diesel Sales Ups Lawrence

W. B. Lawrence is a newly elected vice-president of Cummins Diesel Sales Corp., Columbus, Ind. He joined the Cummins organization in 1948 as Rocky Mountain Regional Manager in Denver, Colo. He continues as General Manager of the eight Cummins dealerships operated by the Sales Corp.

New Sales Mgr. for Canadian Firm

Robert Miller is the new Sales Manager of Innes Equipment, Ltd., Toronto, Canada, distributor of Heil road machinery in eastern Canada. He was formerly Sales Manager of The Heil Co., Milwaukee, Wis.

Dealers—this is your department, so send us your news—new plants, new lines, new staff appointments.

A Century of Service and Dependable Equipment



for the Construction Industry

Manufacturers of Pile Driving Hammers and Pile Extractors
VULCAN IRON WORKS • 329 NORTH BELL AVENUE • CHICAGO 12, ILL.

Supply Tanks FOR HAULING HOT OR COLD BITUMINOUS MATERIALS



Semi-Trailer models are made by the famous Littleford Frameless Construction — no trailer frame is needed.



The Littleford Supply Tank transfers its Bituminous Material to the Bituminous Distributor for fast economical spraying.

To keep the Spraying Units on the job the Littleford Supply Tanks haul the Bituminous materials from the source of supply without interruption. These Supply Tanks are the backbone of all road construction and maintenance jobs. Made with or without heating units or transfer pumps, these units speed up the work, are economical to operate and save labor costs. Made in semi-trailer or truck mounted models in sizes ranging from 2000 to 5000 gal. Semi-Trailers, made without the use of a trailer frame, are known as the "Littleford Frameless Constructed Supply Tank". Make your next road job a low cost modern undertaking, use modern methods and modern equipment, Littleford Supply Tanks.



LITTLEFORD

LITTLEFORD BROS., INC.
485 E. Pearl St., Cincinnati 2, Ohio

STRUCTO

LINE OF CONTRACTORS TOOLS

DEMOLITION TOOLS

PAVEMENT BREAKERS



All STRUCTO tools are made in the modern Arrow shops by skilled tool makers using only the finest quality steel.

In addition to the tools shown above the STRUCTO line includes air hammer tools, star drills, drift pins and pull pins. All are available in a wide variety of sizes and weights.

Every STRUCTO tool is backed by 37 years experience in making fine tools, plus a generous amount of good service to customers.

Write for Bulletin No. 851 showing the complete line.

ARROW TOOLS INC.
1900 So. Kostner Ave., Chicago 23, ILL.



The Wooldridge TC-190 has a 19-cubic-yard struck and a 22-cubic-yard heaped capacity. There are optional oversize side cutters for rocky terrain, tough material.

New 22-Yard Scraper

A new 22-yard tractor-drawn scraper is made by Wooldridge Mfg. Co., Sunnyvale, Calif. The TC-190 has a 19-cubic-yard struck and a 22-cubic-yard heaped capacity. Standard equipment calls for 21.00 x 24 tires front,

24.00 x 25 rear.

The scraper has side cutters of manganese-alloy steel bolted on to protect bowl side sheets. For rocky terrain and extremely tough material, optional oversized side cutters of extra thickness and strength are available.

Positive fast dumping with less trac-

tive effort is said to be achieved by a rolling motion applied by the Wooldridge ejector, pivoted at the blade base. Other features claimed by the company include simple cable reeving and long cable life, maneuverability aided by low gravity center with high ground and yoke clearance, and rapid loading.

Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No. 437.

Tool and Die Salvaging

A 64-page manual, "Tool and Die Salvage Welding", has been issued by Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing, N. Y. It contains data on the latest developments and discusses more efficient and more widespread usage of improved tool and die welding procedures.

The manual covers problems in welding-tool steels; it describes an effective welding and salvage program

for tools and dies; and it lists tools which can be successfully welded and salvaged. It includes photos, drawings, charts, and diagrams covering these operations.

This literature, the fourth of a series of "how-to-weld-it-better" manuals, may be obtained from the company, or by using the Request Card at page 16. Circle No. 452.

New West Coast Co. for Waco

With the organization of the Waco-May Scaffolding Co., 3727 San Fernando Road, Glendale, Calif., Wilson-Albrecht Co., Inc., Minneapolis, Minn., manufacturer of sectional steel scaffolding, completes a national manufacturing and distribution program begun in 1946. Wilson-Albrecht has granted the new firm an exclusive license to manufacture and distribute Waco scaffolding in California, Arizona, Idaho, Oregon, Utah, and Washington. Donald A. Spencer is Sales Manager of Waco-May.

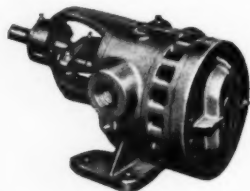
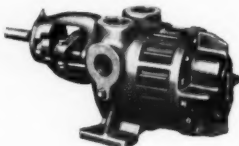
Pumps

FOR MANUFACTURING PETROLEUM, MARINE AND PROCESS INDUSTRIES

MODELS FROM 3/4 TO 300 G.P.M. — CAPACITIES TO 1000 P.S.I.
SPEEDS UP TO 1800 R.P.M. FOR PUMPING CLEAN LIQUIDS

SERIES F

Four-port design offers 8 optional piping arrangements. Equal size helical gears run in axial hydraulic balance. Standard or bronze fitted; packed box or mechanical seal. Up to 300 P.S.I.—1 to 300 G.P.M. for clean liquids.

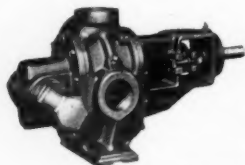
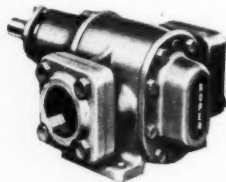


SERIES H

Widely used for hydraulic mechanisms and other applications where high pressures are required. Spur gears provide high volumetric efficiency. Packed box or mechanical seal. Pressures to 1000 P.S.I.—5 to 75 G.P.M. sizes.

SERIES K

For hydraulic service, fuel transfer or fuel supply. Features helical gears and exclusive Venturi suction and discharge principle in 10 through 50 G.P.M. sizes. Packed box or mechanical seal. 150 P.S.I.—3/4 to 50 G.P.M.



SERIES 3600

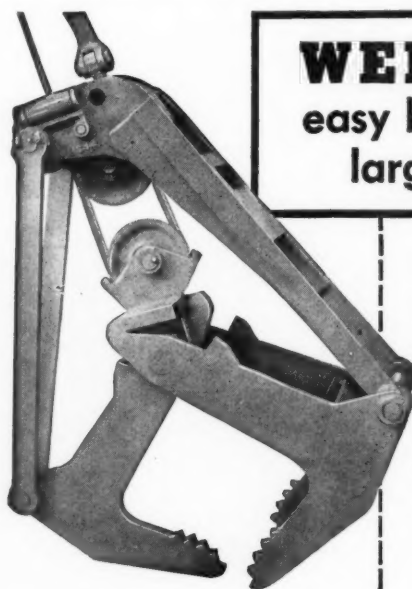
For general purpose work handling thin or thick liquids with suction lift up to 15 feet. Standard or bronze fitted; with or without built-in relief valve. Pressures to 60 P.S.I.—40 to 300 G.P.M.



ROPER

Rotary Pumps

GEO. D. ROPER CORPORATION
228 Blackhawk Park Ave.
Rockford, Illinois



WELLMAN

easy handling of large stones

• Those big stones won't slip from the Wellman Stone Grab. Four-part closing cable reeving develops tremendous closing force on stones. Model shown has 5-ton capacity, 4 1/2 foot jaw spread. Other capacities available.

Want Facts?

Send for free
descriptive bulletins.

THE WELLMAN ENGINEERING CO.

7000 CENTRAL AVENUE • CLEVELAND 4, OHIO

No other Barrow Except *Jackmanco has it!*

PRESS FORMED, DOUBLE
FOLDED CORNER CONSTRUCTION



Oldest and Largest
Wheelbarrow Maker
in America



M11-24B
Model

Extra Strength for long life
Non-Leakable
Easy Pouring

This is just one of the many superior features of JACKMANCO Barrows and one of the reasons why Contractors buy more JACKMANCO Barrows than any other make.

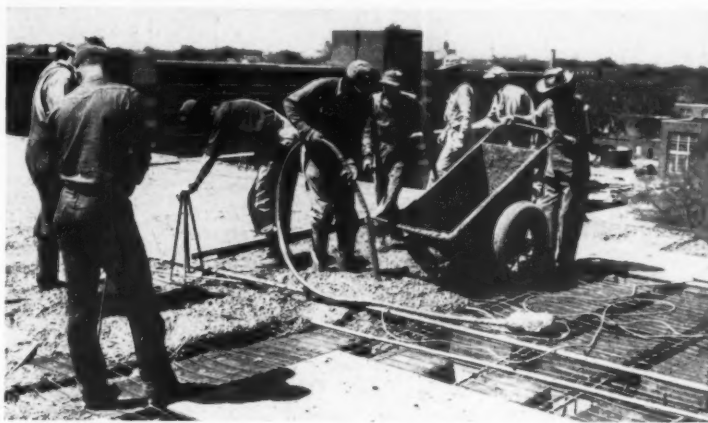
JACKSON MANUFACTURING CO.
HARRISBURG, PENNSYLVANIA

Lightweight Vibrator Speeds Concrete Job

An addition to the Cripple Children's Hospital is going up in Oklahoma City, Okla. It is a three-story reinforced-concrete structure and work is moving along fast. Secor Building Co. of that city has the contract. Dolese Co. is supplying the 3,000-pound transit-mix concrete. Chuted into a 1/2-yard Jaeger tower hoist, the concrete goes up to a feed hopper, then into Jackson rubber-tired carts, and over to the dumping spot.

A lightweight Master electric vibrator is one of the key tools on the job. Easily lifted or pulled over the forms, it does a good job of getting the mix in and around the reinforcing steel and into corner spots. One workman we talked to wasn't worrying about wet concrete getting on the motor unit. "So concrete does get on the case—it doesn't get into the mechanism," he said.

Floors of the building are 4 inches



C. & E. M. Photo

Jackson carts unload concrete on the roof of the Cripple Children's Hospital addition in Oklahoma City. A lightweight Master electric vibrator, one of the key tools on the job, consolidates it.

thick, the roof 2 1/2 inches. Metal pans nailed to 2 x 6 soffits formed joists 8 and 10 inches deep, 5 inches wide, integrally

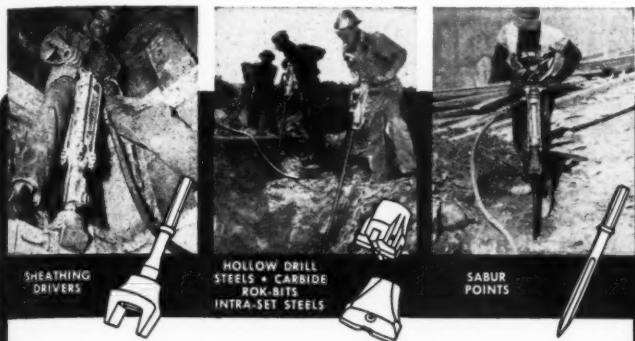
with the floors or roof. Ellis shore clamps on 4 x 4 posts, and 4 x 4 purlins supported the network of pans.

Secor started work in November, 1952, and will have the job completed by November of this year. Pete Novak was Superintendent.

Eberling Rejoins Caterpillar

Herman G. Eberling has returned to Caterpillar Tractor Co., Peoria, Ill., as Assistant Manager of the company's Plains Sales Division. Mr. Eberling, who served in the Army Ordnance during World War II, re-entered the service in 1950, and this year received his discharge. He started his career with Caterpillar in 1933, and from then until 1942 was bench specialist, shop inspector, diesel lecturer, and sales-training director. In 1945, when he finished his war service in the Army, he became a district representative; then an assistant divisional manager.

The former Assistant Manager of the Plains Division, Gordon Flower, left Caterpillar on July 1 to join Burford-Toothaker Tractor Co., Montgomery, Ala., Caterpillar distributor.



... a tool for every job!

Having the proper tool for the job saves time and money for you . . . makes work easier on the operator. That's why you will find the wide range of tools offered by Brunner & Lay of such importance. For every tool there are many sizes . . . each type and size designed for a definite purpose. Shown are a few of these tools. For the exact tool to fit your job . . . let your dealer show you the complete Brunner & Lay line.

Brunner & Lay, Inc.

general offices and main plant
9300 KING STREET • FRANKLIN PARK, ILLINOIS

the reliable, leading source of supply since 1882

affiliated plants
and warehouses
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Los Angeles 11, Calif.
150 Leslie Street
Dallas, Texas

3 ANSWERS TO YOUR CONCRETE CURING PROBLEMS

With the three Permite Concrete Curing Compounds listed below from which to choose, you can count on proper curing, good coverage, low cost, on any type of concrete construction.



PERMITE W-95

A superior Concrete Curing Compound for curing horizontal surfaces.

PERMITE V-167

A Resin Base Concrete Curing Compound for all horizontal surfaces, and for vertical surfaces below ground.

PERMITE V-169

A Resin Base Concrete Curing Compound for architectural or vertical concrete surfaces where non-discoloration is important.

All three meet or exceed the specifications of most States and Counties, the Corps of Engineers, U. S. Army, the Department of the Navy and other Federal Agencies. Widely used on airfields, floodwalls, highways and other great engineering projects.

Write for catalog data and name of nearest distributor.

[A few good Distributor territories open.
Write for Franchise Details.]

ALUMINUM INDUSTRIES, INC.
CINCINNATI 25, OHIO



GOODALL "Standard of Quality" AIR HOSE



Wrapped Duck Construction
Sizes 1/2" to 1 1/4", inclusive

"SUBWAY" is made to stay on the job longer, under conditions that give air hose the roughest kind of treatment . . . to keep rock drills and other heavy-duty air tools in steady, profitable operation. The balanced construction of this hose assures equally long life for cover, carcass and tube. The easily identified red cover is a tough rubber compound that fights severest abrasive wear and rough handling with real championship endurance.

Despite its superior strength and durability, "SUBWAY" is light in weight, flexible and easy to handle. Used for many years as standard equipment by big-job contractors, it never fails to demonstrate the advantages of the "Standard of Quality" specifications to which it is built. Available in maximum lengths of 50 feet.



Contact Our Nearest Branch for Details and Prices



GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches: Philadelphia • New York • Boston • Pittsburgh • Chicago • Detroit • St. Paul • Los Angeles
San Francisco • Seattle • Portland • Salt Lake City • Denver • Houston • Distributors in Other Principal Cities
Est. 1870

Loader Is Redesigned

A design improvement in its self-propelled belt-type TraveLoader, to permit loading of material from stockpiles as well as windrows, is announced by J. D. Adams Mfg. Co., P. O. Box 853, Indianapolis, Ind.

Spiral blades on the full-floating feeder work the material into 14 curved blades, which in turn place the material on the revolving conveyor belt. The feeder is hinged at the rear, leaving it free to float and adapt itself to the size of the windrow or stockpile.

From the operator's cab the rear section of the conveyor is adjustable to provide a wide range of discharge heights for different-sized trucks. Hydraulic controls raise or lower the full-floating feeder, the entire front of the loader, and the rear section of the conveyor. Over-center-type clutches control the feeder, the conveyor, and the forward and reverse movement.

The TraveLoader is powered by an



The Adams TraveLoader has been redesigned to load material from stock piles as well as from windrows.

International industrial-type gasoline engine which furnishes power for the feeder and conveyor as well as propelling the machine. An auxiliary transmission permits travel speeds from 0.23 to 25.5 mph. Front and rear

fenders and complete cab enclosure are optional.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 456.

CONTRACTORS—SAVE TIME & MONEY WITH LUG-ALL HOISTS



THE LUG-ALL

Aluminum alloy frame withstands 5-ton load! Flexible aircraft cable—133 strands. Stainless steel springs. Bearings oiled for life. Safety handle bends at 100% overload to protect hoist and user.

GUARANTEE

Every LUG-ALL guaranteed one year against defects in workmanship and materials.

New, Light-Weight LUG-ALL
Weighs under 10 lbs., Handles 1½ tons

Contractors everywhere are telling one another about their LUG-ALL light-weight portable hoists. Weighs less than 10 lbs., yet lifts, lowers or pulls 1½ tons for 5 feet; ¾-ton a distance of 10 feet. Slings available for extra long reach.

MANY MONEY SAVING USES

Construction men in 46 states use the LUG-ALL for raising scaffold beams, lifting pipe sections, lifting and aligning steel work, drawing reinforcing mats, repairing chains and tractor tracks, straightening piling, aligning concrete forms, placing stone work, positioning machines, installing unit heaters, etc.

Works well in restricted spaces.

ORDER TODAY

Heavy-Duty Model described, only \$35.25, FOB Factory. Send for LUG-ALL Bulletin #107, containing hoisting hints that are helpful on your jobs.

ORDER YOUR FIRST LUG-ALL TODAY!
THE LUG-ALL COMPANY
WYNNEWOOD 2, PENNA.

4-Cycle Air-Cooled



Kohler Co., Kohler, Wisconsin. Established 1873

KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

KOHLER ENGINES

Kohler Engines provide reliable power for a wide range of uses. Compact, quick-starting. Engineered and built to the high standards that have won world-wide acceptance for Kohler Electric Plants in construction and other industries. The Kohler mark has been identified with quality products for over three-quarters of a century. Write for information on distributor's sales franchise.

Info on Transmission

A graphic description of how to shift the new Road Ranger transmission is given in a folder available from Fuller Mfg. Co., Kalamazoo, Mich. Pictures and diagrams show how one lever shifts the Road Ranger up or down through 10 forward speeds without gear-splitting, by using the 5-speed shifting pattern twice. It shows steps by which the driver can minimize fatigue, reduce wear and tear on engine and chassis during speed-up and slow-down driving, and make "skip shifts" when conditions warrant.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 480.



Measured Production When It's A. G. C. Rated

Mixer "output" need no longer be an unknown quantity to architects, engineers and contractors engaged in the serious business of estimating concrete or determining the proper mixing capacity of a drum.

That Is — Not if the Mixer Is A.G.C. Rated . . . For drum sizes and proper mixing capacities are guaranteed on all mixers wearing the A.G.C. label.

Protect yourself — be sure the mixer you buy is A.G.C. rated.



Mixer Manufacturers Bureau

Affiliated with the Associated General Contractors of America, Inc.

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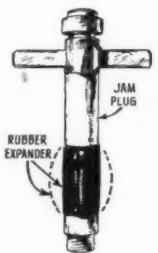
WORTHINGTON CORPORATION
Construction Equip. Div., Plainfield, N. J.

Nelson Moves Eastern Office

Nelson Stud Welding Division of Gregory Industries, Ltd., Lorain, Ohio, has transferred its eastern regional headquarters from New York City to a new factory branch warehouse at Baltimore Pike, Springfield, Pa. The activities conducted at the company's Philadelphia branch, too, have been transferred to the Springfield office. The new warehouse carries a full line of parts and accessories, and Nelson stud welding guns and Nelwelder generators and batteries are available for sale or rent.

Richard E. McGinnis, former Philadelphia Branch Manager, is Eastern Regional Manager, with headquarters at the new office. His territory includes the Atlantic seaboard, southeastern New York, and eastern Pennsylvania.

CB JAM PLUGS



afford quick, easy tight grout hole connections for inlet holes drilled in rock, concrete, masonry, etc. A few turns of expander screw tightly cushion sleeve against the hole permitting full flow of grout, and firm seal around the grout hole. Reverse turn of handle releases plug. 1½" size (2¼" hole) \$20.00 each. 2" (3" hole) \$35.00. Extra sleeves available.

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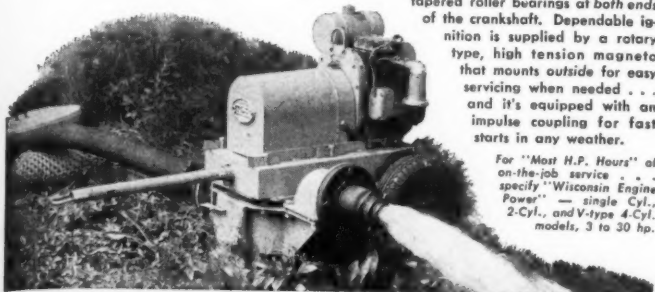
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WISCONSIN- POWERED Rex Pump

Designed to meet de-watering requirements in which large amounts of solid materials are present, this 4" Closed Diaphragm Rex Pump will handle up to 6,000 gals. per hr. on a 10-ft. suction lift. It's built by Chain Belt Co., Milwaukee, and powered by Model AKN 4-cycle single cylinder Wisconsin AIR-COOLED Engine, turning up 3 1/4 hp. at 2100 rpm.

Like all Wisconsin Air-Cooled Engines, from 3 to 30 hp., this rugged little power unit runs on Timken tapered roller bearings at both ends of the crankshaft. Dependable ignition is supplied by a rotary type, high tension magneto that mounts outside for easy servicing when needed . . . and it's equipped with an impulse coupling for fast starts in any weather.

For "Most H.P. Hours" of on-the-job service specify "Wisconsin Engine Power" — single Cyl., 2-Cyl., and V-type 4-Cyl. models, 3 to 30 hp.



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World's Largest Builders of Heavy-Duty Air-Cooled Engines
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- 5-D-8 Caterpillar tractor—all reconditioned —2 with dozers.
- 1-Northwest Model 25 shovel and dragline Only 3,036 hours on it. Has shovel front and bucket.
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- 1-Euclid loader, Serial #5BU-34—ready to go to work.
- 1-Euclid bottom dump, Serial #9FDT2582 CMC Motor—Tires all good.
- 1-A-C Motor Patrol, Model AD3

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- 1-Allis-Chalmers Model B tractor with mower.
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- 1-Bros Model SG-55 skid mounted steam generator.
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- 1-Novo traffic line marker.
- 1-Allis-Chalmers Model HD 19. Recently overhauled, equipped with Baker hydraulic angle dozer.

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1-Clark Marine Diesel Engine, Model MD-4, 350 H.P., 275 R.P.M., 4 cylinder, 2 cycle engine including some spare parts. Engine is new and has never been used.

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Bolander's Tournadozer pays off year-round



Opening snow-bound road southwest of New Market, Minn., Tournadozer worked continuously through drifts like these (you can get a good idea of their height by comparing banks with the "C's" approximately 6'-high tires). Optional snow wing is available for widening.



On dirt job near Kenyon, Tournadozer push-loads 10 pay yds. of boulder-laden clay in Tournapull bowl in 60 sec....distance, 125'.

Opens snow-clogged roads after other units fail

Last March's record-breaking 38-inch snowfall presented Scott County, Minnesota, with a serious emergency. About 100 miles of farm-to-market roads were blocked; in many places with drifts 11 ft. deep. Farmers in the area were totally snow-bound. Trucks and other plowing equipment couldn't get through... yet the highways had to be opened — *fast!*

An emergency call was sent to Minneapolis for Carl Bolander & Sons' rubber-tired, V-plow-equipped Tournadozer. This 19 m.p.h. rig drove to Scott County over main highways and, without delay, started secondary plowing and widening. "It was one of the toughest clearing jobs New Market Township has ever had," says Company President Iver Bolander. "The March snow was the heaviest seen here in years (heaviest single month since 1890, says Weather Bureau)... much of it was re-frozen... yet our Tournadozer accomplished the work where all other units failed."

In all, Tournadozer, working without chains, cleared and widened 100 miles of roads. Its big, low-pressure rubber tires did no damage to pavement, shoulders, or railroad tracks.

Bolander used this same rig as a high-speed Bulldozer throughout the dirtmoving season. On a typical job — regrading the Chicago Great Western RR right-of-way south of Kenyon, Minnesota — it push-loaded 2 electric-control C Tournapulls... with the Tournapulls alternating on 9000' and 6000' cycles, regularly accounted for 16 loads (160 pay yards) of rocky loam and clay hourly. In spare time, the versatile, high-speed "C" handled small backfilling assignments, clearing, etc.

Doubles LeTourneau fleet

Performance of these 3 LeTourneau rigs was so satisfactory that Bolander & Sons recently bought 3 more units... 2 C Tournapulls and their second Tournadozer.

If you too want to make more money, better check into this high-speed, rubber-tired equipment for yourself. You'll find Tournadozer the only dozer on the market with speed (19 m.p.h.), power (186 h.p.), and "go-anywhere" mobility to profitably handle snow plowing assignments as well as normal dirtmoving jobs. Ask your LeTourneau Distributor for ad reprints showing owner-verified performance reports on work like yours.



Tournapull — Tournadozer — Trademark Reg. U. S. Pat. Off. 5-87-H-8



R. G. LeTOURNEAU, INC., Peoria, Illinois

HIGH-SPEED, RUBBER-TIRED SNOW PLOWING • EXCAVATING • HAULING • LIFTING EQUIPMENT

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